Long Time No See

Exhibition Guide

This exhibition is about finding clarity beyond age.
We come into contact with objects from all manner of backgrounds, some still cared for, and some long forgotten. While these artefacts may all be completely different, they share one important similarity – Memory.

Every item, every material that we care for has lived and created memories from those it has belonged to, every object has experienced a past we will never get to truly comprehend.

As conservators, it is our duty and our passion to preserve these fragmented memories and give people the chance to create new memories in new contexts, thereby building an interconnected web of experiences that encompasses a whole new generation.

As you explore our exhibition today, we'd like you to think about those who came before you, and the significance each of these artefacts had in their lives. Perhaps, one day, an item of great value to you will be in its place!

Chemical and Solvents Glossary

Paraloid B72: An acrylic resin which is commonly used as an adhesive for repairs or consolidation.

IDA (Industrial Denatured Alcohol), White Spirit, Acetone: Examples of solvents we use in our treatments for chemical cleaning or making solutions of different concentrations.

Araldite 2020: A two-part epoxy resin. It has a low viscosity which makes it suitable for some ceramics.

Paramose: Also known as dichloromethane, this is a strong chemical used for removing resins and paints.

Processes Glossary

*Consolidation: S*tabilising either the surface or structural condition of an object. It is based on reinforcing of strength and providing further support to an object to prevent, for example, the failure of joints.

Adhere/adhesive/adhesion: As students and conservators, we typically use the term ‘adhere’ instead of ‘glue’ when describing treatments. ‘Glue’ and ‘adhesive’ are not interchangeable as the substances themselves are not the same. An adhesive is a more synthetic substance, such as acrylic resins like Paraloid, whereas a glue is of organic origin, so will only be used to describe such substances like fish glue or other animal glues.

Air abrasive cleaning: Using a concentrated blast of fine particles to dislodge surface dirt. This is especially useful for highly corroded or archaeological metals which have high amounts of surface dirt or soil.

Preventive Conservation Glossary

RH (Relative Humidity): The relationship between the volume of air in an area and the amount of water vapour it holds at a given temperature – as a percentage.

Lux: This term is used to denote a unit of light, known as lumen per square metre. This is typically used in consideration of object storage or light damage, in preventive conservation.

Preventive Conservation: This covers action taken to protect an object from further damage. It is one of the most important parts of all object treatments, as repairs to damage can only be helpful where further damages are prevented.

Analysis Glossary

XRF: X-Ray Fluorescence Spectroscopy, an analytical technique used to identify the elemental composition of an artefact's material. Particularly used when an object has a suspected presence of toxic components such as arsenic or mercury.

X-Ray Imaging: An analytical technique used to scan the internal components of an object, which can often reveal hidden information not seen on the external. For instance, X-rays are used to reveal the internal wire structure of taxidermy specimens.

FTIR: Fourier-Transform Infrared Spectroscopy is used to identify organic and inorganic compounds by measuring how they absorb infrared radiation. It can be used for pigment analysis.

RTI: Reflectance Transformation Imaging is a technique that shows how light interacts with an object from different angles which can make it easier to view inscriptions.

Multispectral imaging: A non-destructive technique that uses different wavelengths to view and analyse objects.

Spectrophotometry: A technique that measures how much light is absorbed or transmitted by a material. It can be used to compare and match known colour samples.

Gilding Glossary

Gesso: A mix of animal glue and chalk used as the first layer in gilding. It can also be made into a putty to fill small losses in frames.

Bole: Refined, coloured clay that gold sits on in gilding. Different colours give the gold a different tone.

Oil Gilding: The simpler, more economical and durable form of gilding. Gold leaf is applied simply using a tacky 'varnish' layer and remains relatively matte. Students used a simple thin rabbit skin glue to apply the gold leaf.

Water Gilding: The more skillful and laborious gilding process requires more gold leaf to cover a surface. This is the only type of gilding that can be burnished, which is a technique that produces a high shine on the gold. Water gilding uses a combination of weak glue size, water and alcohol. The students used an alcoholic gin to complete the water gilding on the projects.

Compo: Also known as 'Gilder's Composition', this is a traditional recipe used for casting, in order to fill gaps on frames. Compo is a thermoplastic casting material, which means it can be made malleable with heat if it begins to set. The recipe includes a mixture of animal glue, resin, oil and whiting (chalk).

Conservation Practices: Present and Future

Ethical Principles

Knowing why treatment is proposed

Before creating our treatment proposals, as conservators we must acknowledge why treatment will be taking place and what the outcome of this action should be. This is undertaken by liaising with the object owners, who have their own aims and needs for their object that we endeavour to complete. This is balanced with the object's own material needs.
Aims must be clearly defined and understood. Treatment should be appropriate, sustainable, and effective at achieving aims with the least intervention possible. The option of no action at all should always be investigated first.

Understanding the issue

Decision making should be governed by thorough analysis of the object's significance, including its tangible and intangible values.
Treatment options are then informed by research on the underlying causes of deterioration, covering both structural and surface deformations discovered in a condition assessment.
Considering resources and constraints
Our decisions are informed by an assessment of consequences, risks, and benefits.
We must consider our own abilities and aim for the best quality treatments with available resources.

Designing the action

We must consider preventive conservation in our actions, which covers maintenance and protection of the object in the future.
Our treatments aim to be detectable and reversible, so they can be re-treated in the future if necessary.
Treatment should only be completed where there is evidence to support the intended aims and the methods proposed for achieving them.

Documentation

We aim to document every action taken during treatment and record all changes to the objects. This allows the owners, and future conservators, to fully understand the work carried out and acknowledge the preventive measures advised.

Moving with the Times

The conservation ethical principles provide a standard that everyone is working towards, however, as the world changes, it is important to adapt. Climate change and sustainability, decolonisation, and accessibility are all increasingly being discussed across the heritage sector, and conservation is no different.
As conservators, we work to preserve the world's cultural heritage, and
it is important that we make ethical decisions that involve the appropriate people. This can partly be achieved by diversifying the field to bring in
new perspectives and ideas, and partly by embracing new methods and technologies.

Ethics in the Future

Digital heritage is an expanding field, using 3D scanning techniques, Reflectance Transformation Imaging (RTI), and virtual reality to broaden the possibilities for treatments and audience engagement. Using digital scans means audiences can view fragile objects more easily. Testing materials means more sustainable options can be used.

However, as digital heritage is explored further, there will be new ethical considerations to make. Should original material be kept? What happens if digital files become corrupted, or technology becomes obsolete? What is the environmental impact of digital heritage?

As conservators it is our job to ensure that all heritage is preserved to the best of our ability. While we work on historical objects, we will also look to the future for new perspectives.

Digital Heritage and New Technologies

Digital tools can be used to for the dissemination of cultural heritage, aid complex conservation treatment, and create reconstructions.

Digital tools were explored to aid the conservation treatment of a phrenological bust – to create a large gap fill of the cranial. The use of common methods for gap filling were challenging due to the lack of accessibility to the inside of the bust. Digital 3D scanning and printing techniques were employed with the intention of creating the gap fill digitally from the negative space, fitting the break edge exactly. This could be 3D printed and used to create a mould, from which a cast in a suitable material for conservation, such as plaster, could finally be made for the fill. Alternatively, the area surrounding the missing section could be printed, and an exact fill could be created using the replica and the usual techniques. The object was 3D scanned using a handheld Artec Space Spider 3D scanner by Kirsty Metcalf, from which a digital model was created. The 3D scan and model were edited by Kevin Hallsworth in preparation for printing. While the remainder of this method was never actualised due to the time-constraints of the project, the 3D model is accessible digitally which enables alternative applications. The model is an accurate representation of the object's exterior condition prior to gap filling which can be used for documentation, investigation, retreatability and digital reconstruction.

Sustainability

As custodians of cultural heritage, it is our responsibility to ensure the preservation of these invaluable treasures for future generations. Sustainability in conservation is not merely a choice but a necessity, driven by the urgent need to mitigate the impact of human activities on our planet.

The significance of sustainable conservation practice lies in its ability to safeguard our cultural heritage and the environment. By adopting sustainable methods such as materials, techniques, and management strategies, utilizing renewable energy sources, employing eco-friendly materials, and implementing efficient waste management systems, we contribute to reducing the carbon footprint in a laboratory environment with a combination of strategies aimed at minimizing energy consumption, optimizing resource utilization, and promoting sustainable practices.

For us, sustainable conservation also means promoting social equity by fostering community engagement and empowering local artisans and craftspeople.
It's not always about adopting the latest technology; more often, sustainability stems from environmental awareness and a mindset of responsibility.

We understand that meaningful change must be systemic, but as emerging professionals in a growing industry, we feel the responsibility to address our role within this system. By adjusting our practices for a more conscious consumption, we take the first steps toward a more sustainable future. This involves thoughtful resource management, opting for eco-friendly materials, and implementing energy-efficient methods.

Sustainability choices in treatments

Instead of preparing new materials, using pre-prepared materials from a previous student to avoid waste.
Wheat starch paste was created in small amounts and stored in the fridge when not in use to extend its usability. It was also shared with other students to prevent additional waste.
Solvents were measured carefully to reduce waste, or accessed in-situ with clean swabs or dispenser bottles to avoid pouring out excessive amounts into beakers.
Where possible, solvents and solutions with long-lasting ageing properties were chosen to reduce the need for re-treatment, thus reducing waste in the future.
Materials such as Melinex, Plastazote, Tissues and blotting paper were all taken from a shared drawer of clean off-cuts from previous uses, rather than cutting from a new sheet and creating waste.
Bench paper and nitrile gloves were only changed when necessary to further reduce waste production.

Decolonisation

While today we are celebrating the conservation of heritage, it is vital to consider the importance of decolonisation. Museums and exhibitions are fundamentally unable to be neutral as bias and different political values are intrinsic to the objects on display and the way the information is, or is not, presented.

Throughout this country's imperial history, countless objects have been stolen from colonised communities and assimilated into museum collections in Britain, where the vast majority of these objects remain to this day.

Decolonisation in heritage is an effort to take accountability for these historical injustices by openly acknowledging the colonial roots of contemporary collections and work with underrepresented communities to ensure that all knowledge and expertise is valued. It is important that decolonisation is considered in every aspect of the museum and not only in specific public facing exhibitions. Considering or not considering decolonisation within every aspect of museum work is a political statement.

Part of our responsibility as conservators is to acknowledge that our exhibition is not exempt from colonialist roots. The explicit marks of imperialism are present in the collection in our phrenological objects, which are physical pieces of a historical system which contributed to the racist ideology used to justify 20th century imperialism. We are also exhibiting two specimens of taxidermy, a craft which also has roots in colonialism. I many cases, taxidermy dioramas were used to enforce stereotypes of colonised countries as exotic and less civilised, as well as causing harm to their wildlife populations.

On the other hand, imperialism is present even in those objects which may appear neutral on the surface, such as our textile pieces, which are the products of an industry with deep roots in the colonial extraction of resources and labour. By conserving pieces like these, we preserve valuable physical sources through which we can interrogate the injustices of the past, and by openly acknowledging these issues we hope to contribute to a more critical heritage sector.

Acknowledging the injustices in our history means that, as a sector, we can work towards decolonised collections which place communities at the forefront of decision-making and allow for a more equitable future.

Learn more at https://www.museumsassociation.org/campaigns/decolonising-museums/supporting-decolonisation-in-museums/

Fibre Analysis

Understanding what fibres are involved in a textile can have an impact on the properties or treatment needed. However, it can sometimes be difficult to know what fibre has been used, so we need to use different tests to get a better understanding.

Microscope Activity

A microscope is set up at the booth with an unknown fibre! Using the students' Flow Chart resource provided in the booth, see if you can identify the mystery textile.

Ignitions Tests

Ignition test – Each type of fibre has different burning properties, specifically, how easily it ignites/extinguishes, its olfactory properties (smells) and the appearance of the ash. Therefore, igniting a sample with a small lighter allows for a mystery fibre to be further identified. The following is a table used by students to identify characteristics in the ignition test.

Ignites Easily	*Ignites Easily Self-extinguishing*	*Difficult to Ignite Self-extinguishing*
Cotton, bast, leaf, rayon and all cellulosic fibres burn with an odour of burnt paper. Ash is fine and fluffy.	Wool, hair has a typical odour Ash is a black bead.	Nylon has an odour of celery! Ash is a fawn-coloured bead.
Regenerated fibres (cellulose acetate) have an odour of acetic acid. Ash is a black bead. Acrylic fibres also leave a black bead.	Silk also has the odour of burnt hair. The ash is black and soft.	Polyester also has an odour of celery! Ash is a black bead.

Conditions for Pests to Live (and Thrive)
Food – Objects provide food sources for pests to live on. They mostly prefer organic materials, such as Textiles, Paper, Wood, and Taxidermy.
Habitat – Also known as 'Harbourage', pests require a place to live. They prefer dark, undisturbed areas of museums such as corners, within walls, and underneath furniture.
Oxygen – As living organisms, all pests require oxygen (O2) to survive.
Correct Temperature (sometimes correct RH) – Pests cannot endure extreme temperatures, whether freezing or high temp. This means museum temperature (around 21°C) is an ideal environment for pests.
Ability to reproduce – Infestations occur through pest reproduction.

Not Wanted: Dead or Alive – Signs of Pests
Live bugs! – Sometimes infestations can be discovered living and thriving within museum buildings and collections.
Carcasses/shells – Pest remains can be found lining windowsills or in crevices of artefacts, but these do not necessarily indicate live infestations...
Frass, larvae, and other undesirable elements – Unfortunately, materials can often be found covered with insect faeces! Known as frass, this often appears as fine dust or powder around where pests feed.
Damage – Fresh holes and tunnels are clear signs of pest involvement in objects, seen particularly in textiles/fur and wood. Evidence of this can be viewed in the objects of the match-up game!

The Who's Who of Pests
Pest damage can be severe, irreversible, and often undetectable until deformation is beyond salvage. Pests can be categorised by the type of damage they produce.
Shredders - Carpet Beetle, Case-bearing Clothes Moth and Webbing Clothes Moth.
Grazers - Silverfish, Paperfish, and Booklice.
Borers - Furniture Beetle, Death Watch Beetle and Spider Beetle

Getting it Under Control
After pest infestations are monitored and identified, conservators and museum staff work to reduce the problem through managing both the environment and specific objects. Actions take are based on the scale of the issue and the type of object involved. To eradicate pests, one of the mentioned conditions for survival is removed. This can be done through cleaning, removal of oxygen, freezing infested objects, pheremone traps to stop reproduction.

Keeping Bugs at Bay
Integrated Pest Management is a system all museums use to reduce the number of pests that can cause infestations in their collections. Simply, IPM is about applying preventive conservation methods to minimise the need for interventive treatments. It includes regular monitoring and cleaning which allows organisations to take quick action if pests are discovered.

First Year – Semester 1

Conservation Theory: learning theory concepts so we had a better understanding of the materials we would be working on in second semester and beyond.

Documentation Techniques: learning the basics for professional conservation photography, record drawings, and report writing using dedicated equipment in the photo studio and conservation labs.

Introduction to Visual and Material Culture: gaining an understanding of art styles, learning to look critically at historical art and objects, and analysing their visual qualities through essays.

Conservation Processes: learning some of the processes involved in object treatment such as ethical decision making and cleaning techniques.

First Year – Semester 2

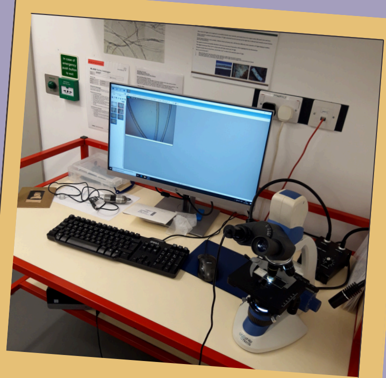
Conservation Processes: continuing to learn some of the processes involved in object treatment such as use of adhesives.

Becoming a Professional: learning skills to help us develop our career plans.

Conservation Science 1: using objects from the teaching collection to build on our knowledge from Conservation Theory to learn methods of scientific testing and material identification.

Applied Practical Skills 1: putting into practice the skills we developed over the year to work on our first objects. We began with simple metal tools before moving onto silver cutlery.

Documentation



Fibre analysis

Air abrasive cleaning

Second Year – Semester 1

Applied Practical Skills 2: developing more practical skills by working on ceramic and archaeological metal objects.

Preventive Conservation: learning about how to control and monitor the environment to reduce the likelihood of damage occurring to objects.

Conservation Science 2: using new analytical techniques to identify materials, such as using XRF and X-Rays.

Second year – Semester 2

A free choice of modules, placements, and studying abroad.

Studying abroad: One student went to Finland to study abroad and the modules were more restoration-focused and covered wood and metalworking.

Placements: Students on placement completed a reflective portfolio to summarise their learning. Placements included Lincoln Conservation, Nottinghamshire Archives, Belton House, Chroma Conservation, Lincoln Cathedral, Museum of Lincolnshire Life, Newark Museum, Royal Pavilion Museums Trust, Skillington Workshop, and Studio Västsvensk Konservering.

Modules: Modules included Gender and Sexuality, Village Detectives, Women in Ancient Rome, Digital Heritage, amongst others.

Nottinghamshire Archives

XAMK - Finland

Colourmatching ceramics

Third year – Semester 1

Applied Practical Skills 3.1: gilding frames and working on a variety of new objects, applying the theory learned in the last two years to complete more complex treatments.

Applied Preventive: taking the learning from the second year preventive conservation module and using it to run training sessions for the Woodhall Spa Cottage Museum volunteers.

Dissertation: planning a 10,000 word dissertation about a conservation topic of our choosing.

Third Year – Semester 2

Dissertation: completing a 10,000 word dissertation about a conservation topic of our choosing.

Applied Practical Skills 3.2: our final practical module with a free choice of objects to work on which you will see displayed here today.

Exhibition: learning about the theory of setting up an exhibition and creating the exhibition you are visiting today!

Woodhall Spa Cottage Museum


Cleaning frames


Fun in the labs

UROS

The Undergraduate Research Opportunities Scheme (UROS) is a funding scheme that supports students taking part in research at the University of Lincoln.

UROS follows the principle of "Student as Producer" which means students have a more active role in the decisions about their curriculum and the research that happens at the university.

After the application process, successful students are given a bursary to allow them to create a research project and complete it with the support of academic staff.

Two of our students, Laurie and Quinn, completed research projects during the summer of 2023 between 2nd and 3rd year and presented their findings at the UROS showcase later that year. They also wrote up their results which have since been published in the University of Lincoln's open access IMPact journal Volume 7 (Issue 3), which can be found online.

Archaeology

From small, personal items used by prehistoric people to the evidence of dwellings and large structures for housing or burial practices, archaeological investigation seeks to uncover and understand ancient human societies through material remains. Reconstructing past ways of life allows a record of cultural progress and identity to be formed and explored.

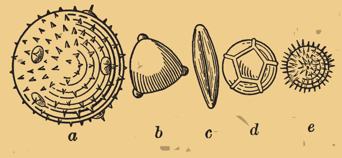
Figure 1. Introduction

Human activity in Lincolnshire can be traced back to prehistoric times, with evidence of round and long barrows in the Lincolnshire Wolds dating from the Neolithic period. The Roman legacy of farming, roads, and villas can be found in Lincoln, connecting to larger paths and routes across England. Place names across Lincolnshire are evidence of Anglo-Saxon occupation, and the Domesday Book in 1086 contains records of manors from the Norman Conquest. There are hundreds of deserted medieval villages across the Lincolnshire landscape, in part due to the Black Death, and partly due to changes in agricultural and farming practices.

Figure 2. A Lincolnshire Settlement History

The analysis of all these time periods and various influences on modern day language, names, and landscape paints a picture of what life was like for people across a wide range of time periods. Old roads and pathways have been adopted to major common roads in the current day, thousands of feet walking the same paths for thousands of years. Although we cannot see the ancient people who existed in the same land we do, we can certainly see how they influenced the landscape, and how they laid the groundwork and foundation for many of the settlements and towns that are established in England today.

Figure 3. Then and Now



The importance of documentation and record-keeping of archaeological finds cannot be understated, and continual analysis and investigation is necessary in order to synthesise a clearer and more accurate picture of the past. Current perceptions change over time, biases evolve and skew our understanding of the past. Remaining objective and gathering as much information and evidence as possible is our responsibility to past societies, our current understanding, and future conservators and historians attempting to do the same thing.

Figure 4. The Importance of Documentation

Archaeologists and the practices of this discipline in the past have not always been carried out with the correct knowledge of historical or cultural context- there are unfortunately many roots in colonialism, imperialism, and western supremacy. Archaeologists of the past did not necessarily have a code of conduct to keep in mind when beginning their investigations and excavations, and as a result, old objects, materials, and human remains deemed as less valuable or important were destroyed.

Figure 5. Past Issues

Today, there is more consideration when dealing with remnants of the past. Local and indigenous people and groups are more often included and recognised by researchers, and the historical, social, cultural, and religious aspects of a site are more fully understood before any actions are carried out. There is more specificity in planning an excavation and how it contributes to the historical record, and alternatives to destructive fieldwork should be utilised when possible. Research and findings, which so often go unrecorded and lost, should be properly documented and presented for future use.

Figure 6. Code of Conduct

Archaeological finds are tangible remnants of the past, still being uncovered and analysed today. With changes to the climate, previously undiscovered artifacts and objects are revealing themselves, while at the same time others are being erased from material history. Therefore, archaeology covers the surface idea of 'Long Time, No See' two-fold: the past societies, people, and their possessions may be buried or obscured from the current time period, while already discovered finds are rapidly disappearing from the record.

Conservation of archaeological objects considers the history and context of the object. Like all treatment, full documentation is completed of the before and after. Intervention should be kept to a minimum to preserve the possibility of scientific analysis such as dating. Any restoration should only be carried out when the function of the object is known and should never be carried out solely to increase the financial value of an object. Lastly, conservators should keep themselves informed about current archaeological practices and work closely with professionals for ethical decision making and best practice.

Figure 7. Archaeology and Long Time, No See

Second Year Archaeology

These objects were discovered at an Anglo-Saxon grave site in Scremby, Lincolnshire. The investigation of this site uncovered 24 burials, all dating to between the late 5th and mid-6th centuries AD, and almost all of the individuals were buried with elaborate grave goods. Many of these burials belonged to women, and these grave goods provide important insight into burial practices. They can also indicate expectations in regard to different gender roles, the group dynamic, and how age was perceived among this community.

Bronze disease is a form of corrosion that appears as a powdery green substance on the surface of bronze or copper objects. In some cases, it may appear as a natural patina; patinas are not damaging to the object, while bronze disease is. It is the result of a chemical reaction and can form when copper alloys and chlorides of an object come in contact with water. If left untreated, bronze disease can degrade the object until the original material has disappeared completely.

XRF was undertaken on most objects to identify the type of metal and any possible alloys in order to inform treatment. X-rays of the objects were widely taken as well to identify any cracking or fissures of the interior that would not have been visible to the naked eye or under microscopic examination. X-raying also helped to identify how much of the original material remained, as well as identifying break edges to reconstruct certain pieces. Dinolite was used to investigate the pitted surfaces of archaeological metal and explore the extent of bronze disease on the copper artefacts.

Benzotriazole (BTA) and Incralac are corrosion inhibitors, though they do not contribute to the consolidation of fragile surfaces. In some cases, as with the girdle hanger, bronze disease was present on the surface. This was removed using a glass bristle brush, hawthorn needle, and scalpel, being careful not to remove too much to prevent surface pitting. After surface cleaning was complete, objects were degreased with acetone and put in the vacuum chamber for 1 hour in a 3% solution of BTA in IDA. Other objects contained organic material that needed to be preserved, therefore BTA was applied with a brush. The objects were rinsed with IDA to prevent a white bloom from the BTA treatment. Up to 3 coats of Incralac were applied to the surface of the objects.

The Airbrasive system is often used for highly corroded metal surfaces, and is suitable for iron objects, but copper (often) is too soft of a metal and would be scratched by the fine abrasive particles forced out of the nozzle. Airbrasive treatments are completed within a work chamber using extraction.

Archaeological objects require close monitoring and storage after treatment, due to their age and often fragile nature. There is a risk of bronze disease at relative humidity above 42%, and archaeological iron is typically stored below 15% RH to prevent growth of salt damage.

Anglo-Saxon Shield Boss, 6th - 7th centuries.
Portable Antiquities Scheme
Shield boss: iron, mineralised wood.
Central Bar and small nail: iron, mineralised organic fibres, wood.
20/063
Conserved by Giorgia Cipollone

Anglo-Saxon Shield Boss
The historical and cultural background of the Anglo-Saxon shield boss provides insight into its significance and role within the context of the early medieval period, particularly during the late 6th to early 7th centuries. The shield boss, a central component of shields during this era, played a crucial role in both defensive and offensive combat. It served to reinforce the shield, providing structural integrity and protection to the warrior wielding it. Additionally, the shield boss could be used as a striking weapon in close-quarters combat, adding versatility to the warrior's arsenal.

After undergoing x-ray analysis to discern the structure beneath the soil block and XRF confirmed the presence of iron, with subsequent validation from a magnet test. Testing of the soil revealed that it had pH level of 9, indicating an alkaline environment. Salt testing with positive results for chloride, sulphate and nitrate concentrations. Polarized Light Microscopy (PLM) confirmed the presence of fibre.

Treatment:
Soil removal prior to consolidating and reassembling the parts, utilizing an acrylic resin at 15% and 20% concentrations in acetone. The corrosion was addressed by mechanical cleaning using a scalpel and IDA, additional cleaning followed using an air abrasive tool. Examination and gentle mechanical cleaning of the mineralized organic materials was performed, and the structure reinforced.

Preparation for the desalination bath involved protecting the mineralized organic material with a temporary protective coating that was designed for delicate surfaces with ability to sublime at room temperature, leaving no residue. The treatments continued with a desalination bath solution that was prepared using a 50:50 mix of sodium hydroxide and sodium sulphite. The object was immersed for approximately 25 days, followed by rinsing and oven drying at 30°C. A second consolidation process was then conducted to strengthen fragile components and prevent breakages post-desalination.

Minimum (reversible) infilling, including colour matching, was performed with Japanese paper tissue and an acrylic resin at 5% and 10% concentrations in acetone. Colour matching was performed utilizing acrylic paint. Additionally, the central bar was removed from SB, cleaned with a brush, and subjected to surface stabilization using an acrylic resin in acetone at 1% concentration.

Chain Torc (Period unknown)
Doncaster Museum
Iron
21/1035
Conserved by Chloe Neal

Chain Torc

This object is one of several archaeological grave goods discovered in a group of graves. At the time of conservation, it was unclear when the object was made, though torcs were popular wear up to the 3rd century AD. This object appears to have been made entirely by hand by imperfect formation of the chain links. This allows the view that it was made by a blacksmith. The torc itself is very narrow and eight chains hang down from the front of the torc, in two bunches of four (Figure 1).

The metal of the torc was identified by using a magnet, identifying the metal the object was made from to be iron.

Treatment

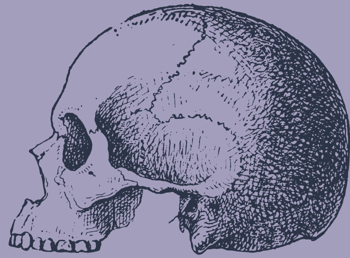
Treatment focused mainly on mechanical cleaning and careful manipulation of the chains to loosen and remove the dirt from the loops but prevent breaking or snapping the metal itself. In some places the surface dirt and corrosion were all that was left of the chain. The manipulation of the chain took a while, and successfully loosened up much of the chain links. Following this was mechanical cleaning using a Hawthorne thorn and a scalpel to remove the loosened dirt and corrosion where possible (Figure 2). This was successful on a large portion of the eight chains on the torc, but in places a more interventive technique was needed, leading to chemical cleaning applied in small areas. Industrial denatured alcohol was applied using a cotton swab, which proved to be a successful technique.

At the end of treatment there were still areas of the chain which remained clogged and stuck in place as there was nothing left of the original chain, and this could not be rectified without breaking the chain.

The torc itself was only minimally worked on to remove the surface dirt as there was no corrosion visible. After a few less interventive mechanical cleaning techniques, such as using a brush, a cocktail stick and cotton swabs, were attempted on the torc, it was the glass bristle brush that worked, followed by a rubber to remove any of the dust lifted, which successfully removed the dirt and revealed the metal (Figure 3).

Taxidermy

Long Time, No See



As with death masks, society's fascination with death lead to the revival of various practices, such as the art of taxidermy and trophy collecting, particularly within the higher classes. Gentlemen sent animals they had hunted to be taxidermied, or imported more exotic animals from overseas.

This resulted in the rise of taxidermy within the home, in display cases named 'Curio Cabinets'. Those in higher society could display their wealth to their peers by showcasing their collections in curio cabinets, or their larger prey mounted on the walls. Alternatively, academics would use taxidermy as a means of investigating different species, often creating what are known as 'study skins' to observe and learn from.

For example, in ornithology (the study of birds), local and exotic species could be mounted and preserved to study their appearance and biology. Today, organisations amass great collections of taxidermy birds that have since gone extinct, such as the collection at the Birmingham Museums. Taxidermy can be the only way of preserving the extinct physical specimens for future generations to explore.

Toys

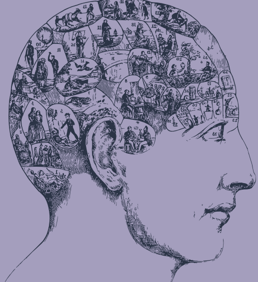
Toys provide an insight into different types of entertainment and also the different social values of their time. Through toys we can understand trading between countries, the working relationships between members of local communities, jobs available to different people, places and clothes that were significant or popular at the time, the resources and materials available, the types of tools that were in use, and much more.

We can also trace how their value has changed over the last century. Dolls and puzzles were typically originally purchased as toys for children, designed to be cared for, but ultimately used for play and entertainment. However, over the decades, they have changed to become collector's items and heirlooms that are treated with more reverence, or else they are simply discarded or sold for low prices when they no longer have value to the owner.
Scarcity almost always improves the monetary value of vintage toys, but even the most generic toys can hold specific sentimental value to an owner.
Each person who comes into contact with such toys will have a different experience and memory, some much more personal than others. Every toy tells the story of its life through the things that have happened to it. By conserving toys, we can construct a record of an adult-run society through the eyes of children.

Curiosities, Oddities, and the Morbid

Forget-Me-Not: Victorian Mourning Culture

Death was an acknowledged, public facet of Victorian society, and with this comes a variety of ways in which honouring the dead and memorialising them took place. Of course, there were aspects that were reserved for the upper class, those with the finances and wealth available to spend on ensuring that they would be properly remembered. While death masks were not an invention of Victorian society, there was a renewed interest in their creation for two reasons. First, they could be kept by families after the burial of a loved one, as a way to keep their likeness close and displayed in the home. The second reason has to do with the emergence of the pseudoscience phrenology, and the belief that the study of the head could determine a person's traits and character. For this purpose, death masks of criminals were created after their execution to further this study and attempt to prove theories.



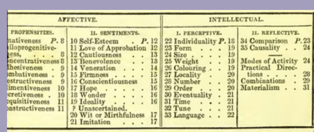
Phrenology

Phrenology is a pseudoscience known as the 'study of the mind' which was developed and popularised in the 18th and 19th centuries. It studies the contours of the head and skull to analyse a person's character and mental capacity but was not able to predict it. The phrenological regions were based on subjective observation and varied for the individual; therefore, conflicting views were developed.

The nature of the science combined with the societal prejudice of the time produced findings with sexist, classist and racist implications.

George Combe, the cofounder of the Edinburgh phrenological society, summarised the phrenological regions into four categories: propensities (e.g., combativeness, secretiveness), sentiments (e.g., self-esteem, hope, wonder), perceptive (e.g., individuality), and reflective (e.g., materialism, comparison).

An example of these societal preconceptions is region 2 which determines 'philoprogenitiveness', described as an 'instinctive love of young' (particular reference to having many children), which appeared larger in females and non-white ethnic groups. Womanhood in the Victorian Era was centred around domesticity and motherhood, which likely influenced the identification of this region. In addition, working class people typically had larger families than middle class people, and non-white families were usually working class due to the barriers put in place to maintain the social division. The racism is more apparent when describing European countries as 'civilised' as opposed to the 'savage nations' of non-white ethnic groups.



AFFECTIVE.		INTELLECTUAL.	
PROPENSITIES.	II. SENTIMENTS.	I. PERCEPTIVE.	II. REFLECTIVE.
nativeness P. 8	10 Self-Esteem . P. 12	22 Individuality P. 18	34 Comparison P. 23
iloprogenitive-ness, ... 8	11 Love of Approbation 12	23 Form . . . 19	35 Causality . . 24
ncentrativeness 8	12 Cautiousness . . 13	24 Size 19	
lhesiveness . 9	13 Benevolence . . 13	25 Weight . . 19	Modes of Activity 24
mbativeness . 9	14 Veneration . . . 14	26 Colouring . . 19	Practical Directions 28
estructiveness 9	15 Firmness 15	27 Locality . 20	Combinations . 29
limentiveness 10	16 Conscientiousness 15	28 Number . . 20	Materialism . . 31
cretiveness . 10	17 Hope 16	29 Order . . . 20	
quisitiveness 11	18 Wonder 16	30 Eventuality . 21	
nstructiveness 11	19 Ideality 16	31 Time . . . 21	
	? Unascertained.	32 Tune . . . 21	
	20 Wit or Mirthfulness 17	33 Language . . 22	
	21 Imitation . . . 17		

Taxidermy Golden Plover (20th century)
Owned by the conservator
Original organic specimen fitted with steel wire and jute tow stuffing, atop a peat and papier-mâché base
23/034
Conserved by Erin Foyster

Cultural Background
Taxidermy is an ancient process of preserving deceased animals, insects and even humans, dating back to the ancient Egyptian mummification processes. Taxidermy gained a lot of popularity in Victorian England around the Enlightenment period, where science and naturalism became increasingly valued. Even Queen Victoria herself was known to enjoy taxidermy specimens featured in what society called 'Curio Cabinets', some say her collection of birds particularly became quite 'imposing'.

Both X-Ray Fluorescence Spectroscopy and X-Ray Imaging identified the specimen's materials. The former confirmed the concentration of arsenic on the bird's skins as a result of preservative treatments used in construction. X-Ray images (Figure 1) show the wire structure inserted within the specimen to provide stability and shape.

Treatment
The structural stability of the plover was increased through repositioning of the leg wires and insertion of an additional wire extending from within the throat, curved inward to support the head. The specimen was cleaned using a museum-grade vacuum fitted with a HEPA filter, covered with netting to prevent loss of feathers. Broken leg bones were secured with sealed string and tinted strips of Japanese tissue. Similarly, Japanese tissue was used to fashion an artificial skin, which was colour-matched, adhered to the throat, and filled with replacement feathers.

Feathers were made using trimmed chicken feathers, which were sprayed with varnish and lightly dusted with powder pigments. The base mount was extended using papier-mâché techniques and acrylic paints, and landscaped using artificial grass and moss, as well as sand, tinted rocks, and a paste of limestone powder, sand and powder pigment. Attempts were made to make the project more sustainable by reducing and minimising waste, for example, use of solvents was limited to necessary quantities used in-situ rather than free-pouring in excess.

The Golden Plover will continue to be cared for by the conservator, affectionately named 'Donald Plover'.

Taxidermy Specimen of a Barn owl and Mouse (late 1700s-1932)
University of Lincoln's teaching collection
Materials: Natural materials, Owl skin; feathers; skeleton; wire; mouse skin; stuffing; sawdust; mouse pelt
TC0856.2
Conserved by Connie Symonds

Taxidermy Barn Owl
This taxidermy diorama features a Barn owl (nicknamed Barnaby) holding a field mouse (nicknamed Whiskey) between its claws (Figure 1). This owl was donated to the Ilkeston Museum in 1932 and added to the University of Lincoln's teaching collection in recent years.

As the case was broken, and space was limited in the conservation labs, the large display was broken down into smaller pieces. The treatment's aim was to present the specimen as per the original intentions. The owl was found to have traces of arsenic through XRF testing, therefore ensuring the specimen was safe for display through treatment and storage became a priority. The presence of arsenic on the object suggests it was produced between the late 1700s and 1932.

Treatment
A soft bristle brush and museum vacuum removed dust and arsenic on the skin of the owl. The tail feathers were straightened using layers of blotting paper and distilled water. A toothbrush was used to brush the feathers straight which also removed surface dirt (Figure 5). The mouse tail and ear was reattached using PVA-c applied using a cocktail stick for accuracy.

To repair areas of loss on the mouse a piece of fake fur was created. Layers of spider tissue were pulled with tweezers, then folded and attached to a flat piece (Figure 6). This was attached with PVA-c diluted with water (Figure 7) then colour matched with powder pigments (Figures 7,8).

The original base was consolidated using PVA-c. Plastazote foam was used to build up the base (Figure 9), then acid-free tissue paper was attached with hot glue (Figure 10). Papier-mâché techniques were used to build on this, then a mixture of sand and PVA was painted onto the base to add texture. (Figure 11). The new base was colour-matched using acrylic paints. Faux moss was added, also retouched with acrylics (Figure 12,13).

The display case was created using 4mm tempered glass, as per museum standards and attached using UV glass glue (Figure 14) and self-adhesive window lead to give the appearance of a classic taxidermy case. A plywood stage was used for the new base to sit upon. This was stained using Fiddes dyes in ethanol, and the plywood was finally sealed with Paraloid-B72 in acetone to prevent off-gassing.

Plaster Cast of a Skull (1796-1867)
The McManus Museum
Plaster of Paris (Gypsum plaster); unknown material coating with added pigments
23/038. 1987-214-56
Conserved by Connie Symonds

Plaster Cast of a Skull

The skull cast was transferred to the McManus Museum in Dundee from the Watt Institute in 1867. As collections are large, it is difficult to determine which person the skull cast was originally based on. To create this cast a plaster piece mould would have been made using several pieces of plaster which take an imprint of the human skull for reproduction. The pieces are held together using a plaster casing and greased to prevent the casting material adhering to the plaster mould. The smooth interior of this skull cast (Figure 1) indicates that it was slip cast, in which liquid plaster of Paris is poured in then left to set in layers. The surface coating was then applied to the surface using a paint brush. Small pieces of newspaper are stuck to the surface in some areas, which indicates the object was wrapped with newspaper soon after it was coated, or changing conditions during storage such as changing relative humidity or temperature caused the coating to become tacky.

XRF testing revealed the presence of arsenic and lead (Figure 5) which informed risk assessments. Multi-spectral imaging revealed that areas of plaster and paint on the surface were not original and required removal. It also revealed the original documentation on the paper label however no useful information was found (Figure 6,7).

Treatment

The overfilled plaster was shaved down with a scalpel, then sanded to ensure the surface matched the rest of the skull in texture (Figure 8). Then the surface was cleaned mechanically using first a soft bristle brush, then smoke sponge and vacuum (Figure 9,10). Then the whole skull was cleaned gently with acetone on a cotton swab (Figure 11). The paint and marks were also removed using this process. Then, the dissociated piece of the paper label was re-adhered using undiluted Paraloid-B72 on a cocktail stick to allow for precision in the application. The paper label was not cleaned further as this could remove any documentation.

The chips and cracks present on the skull cast were then consolidated using a 20% dilution of Paraloid-B72 in acetone, with fumed silica mixed in to prevent gloss. While these fills were effective in consolidating, there were many small bubbles visible which were sanded and retouched with acrylic paints to match the surrounding area. The areas of discolouring elsewhere on the skull, such as the areas of previous retouching and where the overfilled plaster had been removed, were then retouched using the same technique (Figure 12,13).

Phrenological Bust (1824)
The McManus. Manufacturer: O'Neil and Son
Plaster of Paris, oil-based paint, card. Lead and arsenic content.
22/033
Conserved by Rogue Ward

Phrenological Bust
Phrenological busts were manufactured to aid the understanding of the phrenological regions of the brain. This object was created in 1824 for the Phrenological Society of Edinburgh, the first phrenological society founded in the British Isles. The label attached reads 'Dr Elliotson's Daughters' - Dr Elliotson was the founder of the Phrenological Society of London, established in 1824. The lack of an apostrophe on the word 'daughters' could suggest it was a colloquial term for the female phrenology busts in his possession. In the 1830's, conflict arose between the two societies and all connections were severed so the label may have been an attempt at irony by the members of the Edinburgh Phrenological Society. The object was constructed using a piece mould which involved casting multiple plaster moulds from a model, sectioned to fit together perfectly. They were then encased with plaster to create the final mould for casting. The mould was then slip-casted by pouring plaster into an opening in the base and tipping it out, leaving a layer of plaster in the mould which was allowed to set before repetition.

XRF analysis showed the presence of toxic substances lead and arsenic in the decorative surface. A sample of the decorative surface (stratigraphy) was obtained to examine the cross-section (Figure 1). This revealed 5 additional layers on the substrate, each exhibiting varying colours and fluorescence characteristics. The entire sample stratigraphy tested positive for lead. The outermost layer was identified as oil paint because of the yellow UV fluorescence, indicating it is an organic material, and the distinguishing wrinkles present across the object's surface, a typical characteristic of oil paint.

Treatment
The main areas of concern for this object included the breakage, disassociation, and fragility of the present materials. The dirt on the interior of the cast was removed using a brush, vacuum, and eraser. The object was assembled using an acrylic resin adhesive, 40% Paraloid B72® in acetone. The decorative surface was cleaned using 2.5-3% tri-ammonium citrate; any areas of fragile or flaking paint were consolidated using varying concentrations of Paraloid B67® in white spirit. The areas of loss were filled with plaster and built-up using an acrylic and marble putty (Liquitex® modelling paste), retouched using acrylic paint. The label was removed; cleaned using a natural rubber smoke sponge, flattened, and reattached to the object with the original string. The breakage of the string was adhered using wheat starch paste and Japanese tissue wrapped around the surface to secure the bond. The object is incomplete; it still requires reconstruction of the left ear and completion of the retouching.

Plaster Death Mask (1820-1830's)
The McManus
Plaster, shellac-based coloured varnish
23/034
Conserved by Monika Czaja

Plaster Death Mask
The death mask is part of a larger collection of plaster casts used for studying phrenology. Originally, the object belonged to the Watt Institution founded in 1824 in today's Greenock, Scotland and later put in storage as the interest in phrenology faded. It was rediscovered in the early 1980s in an unstable condition.

The sculpture is hollow, with an opening at the bottom of a neck stand. It was likely cast post-mortem to preserve the likeness and features of a recently deceased person. A shellac-based coating was applied over the surface, as both a protective layer, and to enhance the object's aesthetics. The colours were likely chosen to resemble bronze - a more expensive material often used for statues. Moreover, added yellow tint reflects less light and brings out the features and shapes of the face.

A number of analysis techniques were used, including microscope analysis (Figures 3-13), UV light (Figure 14), sample analysis (Figure 15-16), and XRF analysis. XRF showed high content of arsenic (As) and lead (Pb). The death mask was then examined under a microscope (x20 magnification) (Figures 3-13). Visual analysis outlined a few different surface deterioration patterns: paint loss, soiling, soot deposit, scratches and mineralised fibres. Other techniques like Reflectance Transformation Imaging (RTI), Polarised Light Microscopy (PLM), Multispectral Imaging (MSI), and Fourier-transform Infrared Spectroscopy (FTIR) analysis were also used to understand the contents and condition of the varnish.

The identity of the portrayed subject is uncertain and not confirmed. Originally, the death mask was marked with a forehead label which is believed to be a handwritten inscription with the name of the portrayed subject. However, testing was unsuccessful in definitively revealing this information - see inscription table.

Treatment
The mask was previously restored in two areas. The initial yellow pigment retouching was removed, uncovering some of the losses and imperfections of the plaster underneath. The object was first dry cleaned with a soft brush to remove any residue and dust that settled on the surface however most of the sediment was integrated into the object. The running cracks at the back and towards the front of the object were consolidated. The general surface soiling and soot deposits were cleaned using chelating agents (Figure 2).

Death Mask (possibly 1800's)
The McManus
Plaster, paint, thread
23/035
Conserved by Holly Pylko

Death Mask
Although the subject of this death mask is unlabelled, the features present match up with other death masks of Oliver Cromwell, who is one of the most commonly occurring subjects of death mask copies and recreations. Death masks were popular among nobility, but Cromwell's original wax death mask, held now by the British Museum, was one of the first of a non-royal. To create a death mask, a layer of oil and grease covers a cadaver's face, after which thin layers of plaster are applied. Threads are often woven throughout for ease of removal and was often done in parts rather than in one piece. This is visible on this death mask, with a vertical line going straight down the centre of the face.

XRF analysis indicated a high amount of lead and arsenic, as well as other elements commonly used in older pigments, such as titanium, zinc, cadmium, and tin. Areas in which paint layers had chipped off were used to examine the cross section (Figure 1). Due to the various layers present, solvent tests were completed to identify the safest and most effective way to clean the surface without removing areas of paint. Additionally, loose fibres from the loop at the time of the head and the ones slightly ingrained on the forehead of the mask were analysed under a microscope to determine the material.

Treatment
Gentle mechanical surface cleaning was the first step of treatment, in which loose surface dust and dirt was removed from the front and back of the mask. Afterwards, ethanol was applied using a slightly damp cotton swab to areas of bare plaster on the back of the mask - deionised water was suitable for some sealed areas of the face, but the introduction of excess moisture to plaster can cause structural weakening. Darker areas of black and brown staining were removed with a solution of 4% tri-ammonium citrate and rinsed with deionised water. A 4% methylcellulose poultice in tri-ammonium citrate was applied in small areas to the mask for 3-5 minutes before removal and rinsing with deionised water. After cleaning, areas of losses were consolidated using 2 layers of 3% Paraloid B72 in acetone to provide a barrier between the porous surface of the bare plaster and the fills, which had the potential to introduce moisture to the object. A barrier also allows for easier reversibility of the fills- which were done with a putty medium (Liquitex) and smoothed with water to match the surface of the mask. Acrylic paints were applied to colour match to the original paint of the mask and was sealed with 3% Paraloid B72 in acetone before gently applying rottenstone to reduce the shine. The thread loop on top of the head was cleaned with 4% tri-ammonium citrate using a slightly damp cotton swab.

Academy Jigsaw Puzzle (1926)
Owned by the conservator
Walnut plywood puzzle with cardboard box and paper sketch
24/023
Conserved by Quinn deMestre

Academy Jigsaw Puzzle
The puzzle is based on a painting of Knole House that was commissioned by Lady Elizabeth Hope for her book about English Houses in Kent and Sussex (Figure 1). The artist, Charles Essenhigh Corke, lived and worked near J. Salmon's stationery shop and their working relationship meant that postcards and jigsaw puzzles were created featuring the artwork.

Adverts in newspapers from 1930 show that girls aged 15-18 were hired to cut the puzzle pieces using a jigsaw. While this is a few years later than when the puzzle was given as a Christmas present in 1926, the techniques used are the same.
XRF analysis was used to identify what elements were present which revealed arsenic and lead were used in the puzzle box, with trace amounts also present in the pieces (Figure 2).

Treatment
As the puzzle had nearly 200 separate pieces, they were labelled before starting (Figure 3). A treatment map has been made to show all of the areas (Figure 4).

The first step was to consolidate all fragile areas, both in the lifting paper, and in the separating plywood. Once this was done, Japanese tissue was applied to any missing areas before retouching. A few different tests of pencils and acrylic paints were completed to decide what the best method for retouching would be (Figure 5). The surface losses were filled using watercolour pencils and sealed with a thin coating of Paraloid B72 with fumed silica used as a matting agent to create the correct surface finish.

Wood fills were created using layers of thin walnut veneer which were cut and filed to the right shape. These were then also retouched. As one piece was missing, this was recreated with plywood and cut out using a piercing saw.
The box was also unstable at the corners, so Japanese tissue was applied with wheat starch paste to provide more structural support. Wheat starch paste was also used to consolidate the lifting side labels.
Acrylic paints were used to blend the Japanese tissue fills and to retouch the damaged lettering on the box.

A Melinex wallet was made to protect the drawing from stains and creases. New packaging was also made for the puzzle pieces and external box.

Porcelain Doll (early 1890s)
Private owner
Porcelain doll with kid leather body and silk clothing
22/221
Conserved by Quinn deMestre

Porcelain Doll

The doll has a poured porcelain head, as identified by the lip rim inside the head, with eyes and teeth inserted from the back. There is an inscription on the back of her head reading "AM 8/0X", indicating she was made by the German doll manufacturer, Armand Marseille.

Her body is made from kid leather and filled with sawdust. Her legs are attached to the body at the hips with metal pins which allow her to sit upright.
Her clothing resembles British fashion from the early 1890s, with her undergarments similar to a pattern featured in an 1892 edition of the Harper's Bazaar magazine (Figure 1).

While dolls of this kind were originally bought as toys for children, they are now more commonly viewed as collector's items or heirlooms, showing how the perspective of the current owner changes the context of the objects we conserve.
Microscope analysis was used to identify the fibres used in her clothing and body (Figure 2).

Treatment

Treatment began with the more familiar process of filling the losses in the ceramic head with an epoxy putty, drawing on lessons learned in second year. The old adhesive and surface dirt was removed from the head using industrial denatured alcohol (IDA).

The combination undergarments were washed using Dehypon LS45 before being rinsed and dried to remove some of the yellow staining.
Silk crepeline patches were added to the underside of the underskirt to support the areas of loss. As the patches were very small and prone to fraying, a polyester fibre was melted onto the edges to seal them. Laid couching and invisible darning stitches were used to close up the smaller areas of loss.

Dry make-up sponges were used to remove surface dirt from the jacket, before using an invisible darning stitch and silk crepeline patches to add support to the areas of loss.

Agar-agar gels were used to draw out the staining at the bottom of the silk dress. As the silk was very fragile, sewing supports into the silk was not practical. Instead, silk crepeline with lascaux adhesive was applied to the inside of the dress using IDA vapor to activate the adhesive.

Painted Photograph on Canvas (circa.1901-1909)
Lauren Javes
Cotton canvas, paper photograph, oil-based paint.
22/043A
Conserved by Rogue Ward

Painted Photograph on Canvas
The portrait subject is James Carlow (b.1870 - d.1940). He was a sergeant and fought in the second Boer War (1899-1902). The portrait is one of two, the other depicts his wife, Emily (d. 1948) which has already undergone treatment and has been returned. The portrait was manufactured in circa.1901-1909, the photograph was likely made using a wet-plate process and (probably) gelatine emulsion, which was popular in the early 20th century. The monochromatic photograph was colourised using an oil-based paint. Enlarged photographs became popular in the UK in the 1860s; photographers began to incorporate colour by hand to conceal imperfections, directed by clients. Painted photographs were sometimes attached to canvas, creating ambiguity between photographs and traditional oil painted portraits - they also cost significantly less, making them more accessible to the public.

Microscopic analysis indicated that the canvas fibres were cotton, concluded by the distinctive twist in the fibre (a known characteristic of cotton) (figure 1). A test for starch was performed using iodine/potassium iodide and produced positive results. This suggests that either a starch-based size was used on the canvas, or a starch-based adhesive was used to attach the photograph to the canvas. The paint was identified as oil-based because of its fluorescence under UV light and solubility in acetone and industrial denatured alcohol. XRF analysis showed the traces of the toxic substance lead in the paint.

Treatment
The canvas surface was cleaned using a natural rubber (smoke sponge), and encrusted dirt was removed using a scalpel. The object was flattened; moisture was introduced in a closely monitored humidity chamber to minimise the risk of expansion and contraction of the (potential) gelatine emulsion, and the object was flattened under weights for 43 hours. A Reemay® backing was attached to the canvas with BEVA® adhesive film, activated using a heated spatula (70°C) and small iron on medium heat. The delaminated paper was adhered using wheat starch paste. The paint was consolidated using an acrylic dispersion (Lascaux 4176 Medium for Consolidation) and the surface was cleaned using a dampened suction block sponge. The canvas loss was infilled with a surrogate canvas, attached to the backing using the same materials. The paper loss was infilled using spider tissue, using wheat starch paste as the adhesive. All paint loss was retouched using acrylic paint. Temporary storage was made for the object to protect it before it is framed using conservation grade materials.

19th Century Gilded Frame
Private owner
Softwood frame with compo decorations and oil and water gilding
23/121
Conserved by Quinn deMestre and Giorgia Cipollone

19th Century Gilded Frame

The frame has elements of Louis XIV and XV frames which were popularised in the 17th-18th century. The ornaments were made out of composition, also known as compo, which is a mixture of whiting, animal glue, resin, and linseed oil. They were then gilded using a combination of oil and water gilding.

Compo was popularised in the early 19th century as it made complex and detailed frames cheaper to produce and more widely accessible to people. As such, while the frame uses elements from earlier in history, the frame itself is a reproduction, possibly designed to meet the personal tastes of the original owner. The frame is made from a softwood, such as larch or Douglas fir, and was built using mitre joints with natural adhesives and metal nails.

XRF analysis was not possible due to the complex shape of the frame. However, once the original gold was uncovered, testing using the Caratest kit revealed that it was 18-22ct gold.

Treatment

Treatment began with simple cleaning to remove the blue-tack and tape residue that was on the back of the frame. The next step was to remove the bronze paint and required multiple versions of testing to find a method that was successful. Initially, ethyl acetate was chosen as a more environmentally friendly alternative to dichloromethane (Paramose) however Paramose still had to be used.

The frame was then consolidated using fish glue to prepare the frame for moulding. Silicone moulds of existing ornaments were taken, before compo was used to recreate the decorations. Once all ornaments were in place, the frame was reconstructed using fish glue.

To create the right aesthetic finish, the ornaments were gilded with oil gilding, whereas the flat sides were gilded with water gilding. The gold was then aged using raw umber pigment in deionised water.

Shuttleworth Frame (possibly 1800s)
Heritage Antiques
Wood, Dutch metal, gesso, plaster, silver leaf, iron nails, hangers
17/277
Conserved by Holly Pylko, Erin Foyster, Laurie Rees, and Chloe Neal

Shuttleworth Frame
A Neoclassical giltwood, softwood frame in landscape orientation. The Neoclassical period when referring to gilded frames is defined by the linear, classical form- a contrast to other more decorative styles such as baroque or rococo. The use of silver and Dutch metal leaf are intended to create a 'cheaper' gold effect.

Treatment
The waterleaf decorations were cleaned with 5% tri-ammonium citrate and rinsed with deionised water, then moulds were made using Imprep putty. These were filled with dental plaster, using acrylic paints to match the bole of the original decorations. Dutch metal leaf was applied using rabbit skin glue as the size, and the new waterleaf decorations were toned using 'middle gold' bronze powder. Lastly, they were aged using powder pigments.

Lascaux 375 with toluene was applied to reinforce flaking gilding. Loose waterleaf decorations, and any chipped wood and gesso were adhered using fish glue. Following consolidation, surface cleaning was completed to remove dust and thunderfly remains.

Areas of loss were filled with gesso putty, a mixture of rabbit skin glue and whiting. The gesso putty was sanded and smoothed to prepare for gilding. The bole used was watered-down acrylic paint to match the original, applied in 3-4 layers, after which silver leaf was applied, using gin as the size. Rottenstone was rubbed over the surface to reduce shine, and then sealed using 3% Paraloid in acetone. Toning was applied in 3 washes of watered-down acrylic paint to match the colour of the original gilding.

One side of the frame had a missing beam (right vertical side), which was replaced with pine wood, hand-carved and planed. It was adhered using fish glue, and was clamped for 24 hours, with excess glue removed. The bare wood was tinted using watered-down acrylic paint.

The back of the frame was covered with paper, textile, newspaper, and adhesive, the corners of which were removed with a methyl cellulose poultice. L-brackets were adhered to each corner with fish glue to reinforce the structural integrity. Copper hangers and nails were removed from the back of the frame to allow it to lie flat, cleaned using renaissance de-corroder.

Gilded Shuttleworth Frame (circa 1800)
Shuttleworth trust
Softwood, gold leaf, gesso, yellow bole, iron hangers and nails
18/045
Conserved by Sophie Drye and Dafydd Williams

Gilded Shuttleworth Frame
The history of the frame was hard to verify and without a maker's mark, the construction method could only be ascertained by technical examination.

The frame is an example of the neoclassical style popular around the early 19th century. The frame is constructed from softwood and gilded in gold with both water gilding and oil gilding. There is composition ornamentation decorating the frame; the creation of composition material in the late 18th century allowed frame-makers to mass-produce decorative frames without the need for the labour-intensive wood carving of earlier techniques. A boxwood mould could be carved, the soft composition putty could be pressed into it, and once removed, the composition would harden.

Treatment
The frame had previously been cleaned and therefore only required light surface cleaning with a soft brush, air puffer and vacuum (with micro net over the nozzle) due to the open storage between treatments.
Once clean, areas of unstable composition were consolidated with fish glue. To ensure the frame was level, small areas of gesso loss were filled with gesso putty, and larger areas were skimmed with gesso. The coated areas and gesso layers were sanded to ensure the surface texture matched that of the original in preparation for gilding.

To ensure that a new mould taken from the cast would integrate with the frame, the cast was refined using an electrical micro sander. Once complete, a negative silicone mould was made and composition was pressed in and allowed to partially cure before being removed, trimmed and adhered to the frame's corner.
The decoration losses on the top rail were produced using the same materials, however, a silicone mould was cast from a stable area of the top edge decoration.

Acrylic paint colour matched to the original bole layer was applied to the areas of gilding loss along the back hollows. Rose gold leaf was applied to these areas using the water gilding technique. The composition inlays were gilded using the oil gilding technique.
All the gilded areas were artificially aged to match the condition of the original gilding by using rottenstone to reduce the gloss of the gold leaf and diluted acrylic paints to mimic aged appearance of the surface. Before the wash was applied, surfaces that had been water gilded were coated with a 3% solution of Paraloid B72 in acetone to ensure that the diluted paint would not remove gilding.

Society and Culture

Textiles have been used as materials for countless objects, from sofas to ship sails, bandages to bedsheets, but nowhere is their relationship to cultural change, individuals and their bodies more intimate and complex than in fashion. Referring both to the constant change in the style, production and consumption of clothing, and to the physical garments themselves, fashion has been immanent in culture and individual life across recorded history. Clothing is so deeply entrenched in human culture that our garments become akin to a second skin as we dress ourselves for social life based on the social rules of what is 'good' or 'bad' fashion, who can and cannot wear what, and where and when they ought to wear it. The garments and textiles in our collection reflect this, allowing us to imagine the individual experiences of the original wearer and maker, while also reflecting on the cultural forces that surrounded the body that wore it, as well as the hands that made it.

The flapper dress exhibits and accentuates the body, highlighting the radical turn away from the prior restriction of the corset. However, while the lack of a corset in the garment was a mark of newfound physical comfort in womenswear, it's absence meant women were under increasing pressure to maintain their own body to ideal standards through rigorous self-discipline, in a culture of dieting and exercise that was pervasive in advertising and mass media.

The opera cloak shows the changing fashions of formal wear in specific social occasions. The cloak can be seen as a single point in the chronology of what constitutes "formal" fashion in style and construction, but the care and effort taken to create and maintain the object illuminates the personal importance of formal dress for the original wearer. The cloak can illustrate therefore illustrate both the changes in social rules of formal dress, and encourages us to consider our personal relationships with treasured garments, and how sentimental value can be felt in every stitch.

Critical Thinking

Textiles are all around us, and when we look at those present in our own lives, it may be productive to think of them with the same critical lens we would afford to a museum piece.

How does our current system of mass production and consumption, with new clothes constantly procured and discarded, compare to garments which have been painstakingly hand constructed and repeatedly repaired with unthinkable care and patience?

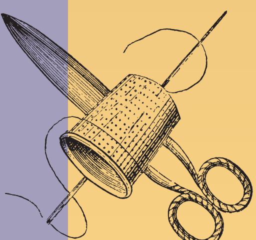
When looking at how historical garments enforced normative ideals onto their wearers, such as gender, body shape, or formality, could we not more critically consider how our own clothing serves these same purposes?

By looking into the past, we can more easily unpick the meanings that textiles and garments weave into our own lives.

The Victorian replica of a medieval thigh decoration shows that fascination with historical fashion is more than just a contemporary development, having captured the interest of many individuals across many centuries.
This pieces highlights the Victorian interest in medieval fashion. The thigh decoration can be used to explore the Victorian interpretation of medieval self-decoration, while also grasping the serious desire behind the object to painstakingly replicate historical fashion and exhibit it through the medium of performance.

Fashion and Textiles

Stretching into the furthest reaches of history and across the globe, textiles have been created wherever humans have existed. The techniques and materials used in both historical and contemporary textile production are remarkably varied, resulting in an extremely wide range of unique fabrics with distinct characteristics. Each physical characteristic, be it strength, weight, weave, texture, colour or lustre, is determined by the choices made at the stage of production, reliant on human skills and knowledge. In this way, the physical presence of textiles can illustrate the intangible human labour and creativity responsible for their existence.



While pieces of textile are intimately connected with their individual producers, they can often inform our understanding of cultures at a wider level, the setting where they were desired, seen, used and enjoyed. Technology and techniques for textile manufacture have been disseminated and developed through the contributions of countless individuals over countless generations, with many cultural groups developing their own unique textiles, whether Scottish Tartan, Ghanaian Kente or Ise ikat cotton, that form an important physical aspect of the cultural heritage of those groups.

Opera Cloak (period unknown)
Kerry Cawkwell
Black velvet, crepe backed satin
22/085
Conserved by Laurie Rees

Opera Cloak
The background of the cloak is somewhat mysterious, as the cloak has no labels and no information relating to its manufacturer, maker or time period. Cloaks in this style were worn as formal attire for Operas, in a black, floor length velvet and satin lining. Cloaks such as this would typically have been paired with a tuxedo and clasped around the neck to protect from the elements. Opera cloaks started to go out of fashion in the late 1800s in favour of the more modern 'Opera coat'. As the owner was unavailable to comment on the background of the cloak, the treatment aims were somewhat limited to stabilisation and decisions of the conservator. It is likely the cloak was handmade, potentially by a member of the owners' family, who were known to be makers. There is some evidence of previous repairs, which were stabilised and retained to ensure retention of any sentimental value.

Treatment
The treatment aim was to stabilise the cloak for storage, display, and handling. Additionally, the conservator hoped to provide suitable storage material, such as a padded hanger and archival textile bag with sufficient supports to ensure tears will not reoccur. Ultimately, retaining aesthetic value through cleaning, and integration of conservation-grade non-adhesive stitch repairs was most essential.

Dry cleaning was undertaken using a museum vacuum with a mesh filter, until the whole surface of the garment was free of dust and dirt. Silk crepeline underlays were then prepared to support the extensive damage to the satin lining were dyed using Ecru (off-white, cream hue) of Jacquard acid dye and hemmed to prevent fraying of the silk supports.

Silk crepeline underlays were prepared to support the extensive damage present on the satin lining. This preparation involved dyeing the support fabric with Jacquard acid dye in an Ecru shade and subsequently hemming the dyed fabric to prevent fraying. Silk crepeline is an effective support due to being strong yet lightweight with good drape, making it perfect for this project.

Hemmed silk crepeline underlays were carefully inserted and secured using an invisible darning stitch, while seams were mended using a whip stitch. Repairs undertaken using an invisible darning stitch were completed using off-white Ultrafyne thread. The ripped seams were mended using a whip stitch and the same thread. This process was an extensive one due to the cloak being such a large and heavy object. Undertaking fine, delicate repairs on a large, heavy object is quite a difficult task.

Flapper Dress (1920s)
Leah Warriner-Wood
Silk, metallic lace, lamé, bobbinet
23/186
Conserved by Finlay Prone

Flapper Dress
The dropped waist and boxy silhouette of this dress lie firmly between the styles commonly associated with Paul Poiret's high-waisted, corseted gowns of the 1910s and Madelieine Vionnet's bias cut gowns of the 1930s. With a shape resembling the dress designs of Coco Chanel, and the appliqué bows echoing the similar trompe l'oeil motifs by Elsa Schiaparelli, the dress bears the stylistic marks of the 1920s. The overskirt, which hangs lower at the back than the front, may indicate the specific period of the 1928/29 seasons, where hemlines began to fall after their previous ascent to the knee in 1926.

This garment fits the image of the flapper, the bright young thing who set aside the corset in favour of the body's silhouette, useful when moving, socialising and dancing are to be done in comfort. However, in lieu of the corset to create the ideal body shape, women began to find themselves under pressure to maintain the ideal shape through the discipline of the body itself in an era where fitness and dieting exploded across advertising and media. In this sense, the dress exemplifies how material changes in fashion can liberate with one hand and restrict with the other.

Treatment
In order to stabilise major damage to the slip underskirt, two underlay panels of a silk with matching properties were attached with support stitches to the reverse of the skirt using Ultrafyne polyester thread. This gave structural stability to the garment which could previously not be safely lifted or manipulated. The surviving loose silk from the damaged areas was then secured to the underlay using self-couching stitches.

To secure the damaged bobbinet at the shoulders, preventing further damage and allowing for ease of future treatment, support stitches were sewn along the edge of the damaged textile. On the rear of the left shoulder, a self-couching stitch was necessary due to the extent of the detachment. Further self-couching stitches secured the damaged lace on the back of the bodice in place.

Replica of a Medieval Thigh Decoration (Victorian)
Museum of the Horse
Velvet, silk, hessian, cotton, metallic trim, iron.
24/025
Conserved by Chloe Neal

Replica of a Medieval Thigh Decoration
This item was made by hand during the Victorian period, likely as part of a costume for a horse show and was later bought at auction with a matching jacket. It has been well used, mended and patched in several places, indicating that it was used quite a few times. It is made almost entirely of silk, or silk-based textiles, showing key skills in the making of the object, and the value that it would have held to those who were using it at the time.

XRF was used on the metallic trim that remains on the object to investigate the metals present. It was found that it was mainly copper and tungsten based. The presence of tungsten dates it to the mid 19th century.

Samples of the two velvets, two silks, hessian, the wadding, the thread, and the second lining used were made up as slides. These allowed both velvets to be identified as silk-based, though one was holding the dye far better than the other. The thread is all cotton, as is the wadding from the ruches and the second lining. The hessian appears to be jute.

Treatment
Treatment began with the stabilisation of the silk, as the silk was shattering and falling away from the object, the backing, and ruches. The backing was addressed using silk crepeline with Lascaux 360. Heat was applied to activate the adhesive (Figure 1 and 2). This technique was applied to all the silk still present on the inside of the object, with a few stitches being added to secure the backing to the object. The silk of the ruches had to be treated differently as to not damage the surrounding materials. The decision was made to cover the silk and the wadding with netting to prevent both from disassociating (Figure 3).

The metal buckle was cleaned with a glass bristle brush where it was visible, causing as little damage to the velvet as possible (Figure 4). Renaissance wax was applied to prevent any future wear or corrosion from occurring.
After stabilising the silk, the detached piece was sewn back into the object itself using a small slip stitch in maroon thread to disguise the stitches (Figure 5).
The metallic trim on the object was missing or loose in places. It was decided that the best method would be to reattach the trim where it was loose and to leave the yellow thread in place where it was missing to show a view of where it used to sit.
The netting that had been added to the ruches was carefully cut down and the remaining edges pushed below the surrounding trim to tidy up the image of the object.

Ise Cotton Yukata Fragment (19th century)
Celeste Sturgeon
Cotton, paper
22/051
Conserved by Laurie Rees

Ise Cotton Yukata Fragment
The ‘yukata fragment’ is a sample cut from a full bolt of 19th century woven cotton. The fabric would have had the potential to have been used to make Japanese field clothing, such as a yukata - a type of summer kimono crafted from finely woven cotton. This fragment features two trade labels adhered to the textile, which communicate the fineness of the cotton.

The righthand label features the ‘wedded rocks’, known in Japan as the Meoto Iwa - a pair of sacred rocks located off the coast of Futame, in Ise city. The textile is of an ikat weave style, with the dominant colour a dark indigo blue, with fine woven segmented stripes in different hues.

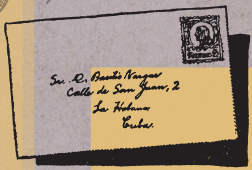
X-Ray Fluorescence (XRF) to test for potential metals used in the mordanting process which may have contributed to the degradation of the fabric.

Treatment
The iron may have rusted over time, causing the fabric to weaken, as can be observed in the bolt of fabric in a degraded state below the conserved fragment. The titanium present may also be from the dye mordant process, as Titanium oxalate is a common agent on mordanting and can produce orange shades. The treatment aim was to stabilise the object holistically, to ensure the three elements were suitable to mount and frame.

Treatment began with stabilising a significant tear in the fabric, then to remove and mend the paper labels separately to the textile. The labels were then repaired using Japanese tissue paper (Washi-Kozo) and adhered with wheat starch paste. To mount the labels in the same position they were on the fabric prior to treatment, two barrier layers (Beva® film and dyed silk crepeline) were used to allow for safe reapplication of the labels.

The supported yukata fragment and labels were placed centrally and secured onto a calico covered, pH neutral rag board. A frame was sourced from the owner, so now can be displayed as seen today.

The Scriptorium



A Word About Inks

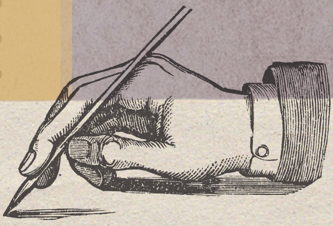
The inks and pigments used in the writing and art of manuscripts, parchments, and books can provide insight to what materials were available, old recipes, and manufacturing techniques- as well as how these have changed over time.

Iron gall ink, for example, was one of the most common inks used for writing on parchment documents from the 4th century onward, and is still around for use today. The recipes for iron gall ink contained the same four main components. These were oak galls which were crushed to create gallic acid, then were combined with ferrous sulphate, water, and vitriol. However, the resulting inks were widely varied depending on the maker, even when the recipe was followed exactly, due to the use of galls from different trees.

Despite the fact that it is still used today, iron gall ink has an ephemeral quality to it, particularly when used in conjunction with parchment documents. The iron ions corrode over time, leading to the text 'eating' the parchment, eliminating readability through the deterioration of both the ink and parchment.

Codicology: The Archaeology of the Book

The material nature of a book, manuscript, or parchment can provide evidence of its creation and use. Historical, cultural, and technological insight can be uncovered by the study of manuscripts and parchments.



Writing is a uniquely human act, and with the creation of writing systems in Mesopotamia thousands of years ago, records and documents from a single point in time were able to be reviewed and understood by people in the future.

Conserving Personal Narratives

Tangible and intangible heritage are inherent in paper and parchment conservation. The physical object may require treatments to preserve its form, but the writing is a reflection of an individual, whether that is personal, legal, or creatively inspired.

All forms of cultural heritage are uniquely valuable for different reasons; paintings give an insight into how someone was viewed by others, toys give an insight into entertainment and the lives of children, and tools give an insight into the technology and materials available. In the same way, handwriting can allow for a more intimate, personal understanding of their personality, their place in society, and what their lives may have looked like.

Parchment Manuscript (18th Century)
Louth Museum
Parchment with iron gall ink
23/102
Conserved by Eloise Pryor

Parchment Manuscript
This 18th century parchment manuscript is a legal document. Parchment was commonly manufactured at this time from animal skin that had been chemically processed, dried and often dusted with chalk to improve the writing surface.
The materials were identified using visual and elemental analysis (X-Ray Fluorescence). Animal skin is evidenced in the grain of the parchment and the hair follicles; an educated guess would place the parchment as deriving from sheep skin, as this was common for the use and period. The XRF results indicated the presence of iron gall ink due to the inclusion of iron (Fe), as well as copper (Cu) which was historically added in some recipes.

Interestingly, XRF also indicated the use of vermilion red pigment, due to the high concentration of mercury (Hg) derived from the cinnabar used to manufacture it.

Treatment
The parchment was mechanically cleaned with a soft-bristle brush along all edges to remove dust and dirt. A smoke sponge was used to clean the more stubborn surface dirt covering the reverse of the document. Humidification was then carried out along each creased edge.

The two small holes along the horizontal folds in the bottom third of the object were consolidated from the reverse using Japanese tissue (toned with acrylic ink) and adhered using wheat starch paste.

The storage environment for parchment should be maintained at 65% relative humidity and 20 degrees Celsius. Fluctuations should not exceed 10% to avoid accelerating deterioration.

The object should be stored flat, and housing should be acid-free. It should ideally provide good stability for the object, along with gentle weighting to ensure that the parchment does not curl back to its original position. Handling of the object should be infrequent, but if required, should be done with clean, dry hands.
The implementation of an integrated pest management (IPM) system should be considered to reduce attraction of pests.

Parchment Document (1702)
Louth Museum
Parchment, Inks
23/103
Conserved by Rob Ware

Parchment Document
This object is a parchment document from 1702 – featuring a portrait of the then monarch, Queen Anne. The text is handwritten in Latin, including the main transcript and the heading “Anna Dei Gratia Anglia Scotia” – translating to ‘Anna (Queen Anne), by the grace of God, of England and Scotland’. Additionally, the top of the parchment features numerous detailed illustrations of mythical creatures fighting one another. The parchment is identified on the back as some form of “recovery document”. The object had previously been stored folded (Figure 1) and was unable to remain unfolded prior to treatment without the use of weights on the corners.

Observation under a microscope of a loss at the centre of the document showed it to be stained and the edges frayed (Figure 2). This suggested that the object had been stored in unsuitable conditions at some point, allowing for water ingress which in turn attracted pests that have eaten away at the parchment.

Treatment
Firstly, surface cleaning was conducted using soft brushes, air blowers, smoke sponge and a Sakura Foam conservation grade eraser. Humidification flattening was then attempted to remove the creases from folding. First this was applied locally in strips across the creases, before being applied completely over the whole object. Wetting layers were then left for 45-60 minutes, checked every 10 minutes until adequately humidified, before being put into drying layers and left for a couple of days.

Repair fills were then made for losses on the top right corner and left side (Figures 3 & 4). For these, a stencil was first cut out of parchment repair paper a couple millimeters wider than the loss. Graphite and acrylic paints were then used to colour-match the repair parchment. The edges of these were then pared off with a rounded scalpel blade and smoothed with abrasive paper and micromesh. A gelatine adhesive could then be used to apply the repair fills to the object. Reemay release layers were placed either side of the fill and the edges pressed down. These were finally covered with blotting paper and weighed down for a few days.

The object should now be stored on a protective board that applies tension to the flattened creases, keeping it flat. Environmental conditions should range from 50-55% RH and 15oC-20oC. It should also be kept in low-light conditions to reduce the risk of fading and other forms of light damage.

Parchment Document (1649)
Louth Museum
Parchment, iron gall ink
23/101
Conserved by Holly Pylko

Parchment Document (1649)
This parchment document is known as an indenture, one of the two main types of legal agreements from the 1600's. The front is written in the style of secretary script, which was common for business and legal purposes from 1525 to 1650 (Figure 1). The back has an example of the style of court script near the flourish, as well as some handwriting that appears to be more modern. Parchment was widely used as a recording tool through the 1600's, though the manufacturing process was a labour intensive one. While parchment and leather are both made from animal skins, the difference is that parchment is not tanned like leather, and is dried under tension. Iron gall ink was made from crushing galls of oak trees to create gallotannic acid (Figure 2). It was then mixed with water to create gallic acid. The final ink mixture is gallic acid, water, and vitriol (iron sulfate).

XRF analysis was completed which indicated a high level of iron in a few different areas of the parchment that were tested, both on the front and back. Further analysis to confirm this identification was completed through UV light, as iron gall ink appears darker under ultra-violet light (Figure 3). Bathophenanthroline indicator paper was used as a final test to identify the presence of iron (II) ions, which are soluble in water, or iron (III) ions, which are stable and insoluble. The test paper from the seven areas remained white, indicating that it was iron (III) ions which were present.

Treatment
Gentle surface cleaning was completed to remove loose surface dust and dirt. A smoke sponge was used to remove surface staining, again avoiding areas of flaking ink. In areas of intense soiling, a lightly damp cotton swab of ethanol was applied. Temporary repairs were applied to areas of tearing to prepare for the humidification and flattening process. The repairs were applied with OK tissue and a small amount of Paraloid B72, appearing as 'stitches'. While using magnets, a metal sheet, blotting paper, and Melinex (Figure 4), a 3:1 solution of ethanol and water was applied with a damp cotton swab along the folds and left for up to 10 minutes. Once flat, the temporary repairs were removed with acetone and glass microballoons, with residues removed using a soft brush and gentle air. 12 GSM OK tissue, texturised with leather and wheat starch paste to match the parchment, was applied using a 2.5% solution of sodium carboxymethyl cellulose, and colour matched using acrylic paint. Lastly, the areas of flaking ink (Figure 5) were consolidated using a 4% gelatine in a 3:1 ethanol and water solution. Ethanol increased the evaporation rate to limit the amount of time that moisture would be present. The solution was applied under a microscope lens.

RAF Logbook (20th Century)
Skellingthorpe Parish Council
Wood-pulp paper, cotton, linen, collagen glue, and inks.
17/248
Conserved by Eloise Pryor

RAF Logbook
This object is a notebook belonging to World War Two RAF Flight Lieutenant E. H. 'Timber' Woods (b.1921 - d.2012). Its contents document Woods' various training and operational flights throughout the Second World War in the years 1939 and 1942, and later contains details of his subsequent post-war flights as a qualified navigator. Inside the notebook's front pocket was Woods' mess bill from the year 1944, and one side of a film negative pouch. The other side appears to have been torn off and subsequently lost.

It was accessioned to the university from Skellingthorpe Parish Council. Skellingthorpe was once an RAF airfield, where Woods was at one point stationed, so the contents of his flights are significant to the town and surrounding area, providing historical and cultural context.

The materials were identified using visual analysis, polarising light microscopy, lignin testing, and Biuret (protein) testing.

Treatment
The notebook was initially cleaned with the use of a soft bristle brush. The margins of each page were individually cleaned to ensure that no dust or dirt remained. To remove the adhesive tape, acetone was used, applied using a cotton swab underneath the start of the tape. The swab was then rolled gently under the tape as it gradually lost adhesion to the paper; this was completed vertically from the bottom to the top of the page.

Handling should be kept to a minimum. The book should be stored horizontally on a clear, well-space bookshelf. Shelving should stand away from walls to promote circulation, and should be well away from windows, doors, radiators, hot pipes. This will assist in avoiding large fluctuations in heat and relative humidity; the ideal ranges of which are between 16-18°C and 50-60% respectively. According to guidance, the avoidance of a 10% fluctuation is optimal for this object.

The storage area should be kept free of dust and pests should be managed with an integrated pest management system (IPM); the object contains organic materials, making it a desirable food source.

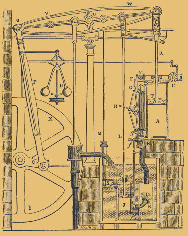
Schoolteacher's Album (1903)
Josephine McKenzie
Paper, textile, leather, paints, ink
23/164
Conserved by Rob Ware

Schoolteacher's Album
This is an Edwardian keepsake album from the start of the 20th century. It was created by a Scottish schoolteacher, Cathie S. Allan, who attended Dundas Vale Training College for teachers in Glasgow. The album features many entries by Allan and people she knew, containing a varied collection of hand-drawn sketches, paintings, poems and extracts. Some of the pages some show a manufacturer's watermark when held to the light (Figure 1). The pages are held together with a simple sewn binding. The outer cover is black leather which has been encased in a hand-sewn textile cover which has then been embroidered. The artworks inside have been made using a multitude of media and techniques – including watercolour paints, charcoal, and pen and ink.

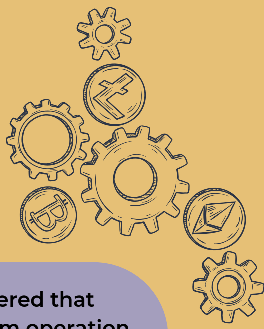
Fine, red, powdery debris found in amongst the pages suggested the presence of red rot on the leather. This was confirmed via visual examination of the leather through the loss on the back outer cover. pH testing was also conducted on a loose paper sample which identified the object as being slightly acidic.

Treatment
To treat the album, surface cleaning was firstly conducted with a soft brush and Smoke Sponge to remove loose dirt and dust. On a loss to the back cover (Figure 2), the exposed cover card was first consolidated, before the exposed deteriorating leather could then be treated for red rot with a 2% solution of Klucel-G in IDA. A padding cotton fill was then inserted to the cover loss and adhered using a 3% solution of Paraloid B72 in acetone. A fill for the missing leather fill was then created using Japanese Tissue, colour matched with acrylic paints and adhered using wheat starch paste. A final colour-matched Japanese tissue fill was then adhered over the top of the textile (Figure 3). Three of the brown tape repairs were removed from page bindings using tweezers, a scalpel and acetone. The loose pages were then re-adhered using Japanese Spider Tissue and wheat starch paste.

The album should now be stored in an archival book box to protect the page edges and separate the object from other collection items in case of risking spreading red rot onto other leatherbound books. Storage should be in a stable, dry environment ranging from 16oC-19oC and 45%-60% RH. When examined, an appropriate book cradle or support should be used, and the pages opened to no wider than a 120o angle. Finally, it should be stored closed, in a dark environment to prevent further fading from excessive light damage. Its pages could also be digitised to reduce the need to examine pages physically.



Working Objects



A working object is one with moving parts, for which energy is provided by either the human body (sewing machine), weights/springs (clock), or generated power (steam engine). In a museum setting, working objects are no longer in their original context, however, they can provide a significant understanding of heritage, so are kept in active use where possible. These types of objects produce many challenges to museums and conservators, as having the object in use can potentially cause damage to the mechanisms through age or wear and tear.

Despite this, it is often considered that removing working objects from operation strips them of their purpose and their historical context, which therefore makes them less valuable as heritage objects. In some cases, keeping the object moving prevents the working parts from seizing up and causing avoidable damage. As some would say, use it or lose it...

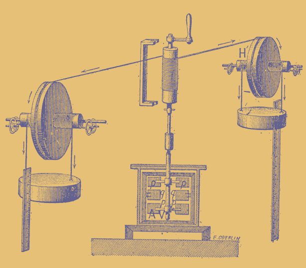
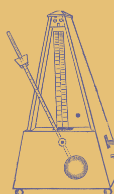
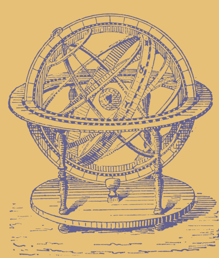
All objects and materials deteriorate over time, and items that may have once been used in daily life are no exception. It is the challenge of the conservator, in that case, to determine the original function of the object, how far treatment should go, and how to make an object still accessible without causing further damage.

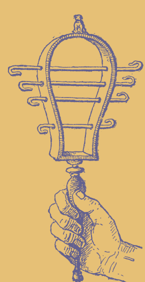
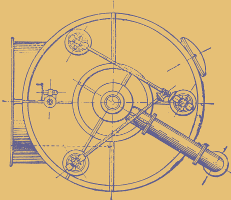
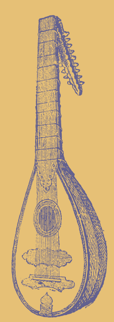
The ethics behind the conservation of working objects often involves balancing the preservation of original materials with the value of having the object in operation. This includes the decision of when to replace or repair elements of the object rather than moving it to storage or static display to preserve the original material. In essence, does the value of an object come from its physical form or its intended purpose? This is often referred to as the balance of tangible and intangible value in cultural heritage, as UNESCO provides, tangible heritage involves any physical forms of our heritage, such as artefacts themselves, whereas intangible heritage are important parts of culture that cannot be 'touched', the more expressive forms of our culture, such as traditional songs or dance. Working objects encapsulate both tangible and intangible as the material object is a physical representation of the culture, while the function of the object and its outcome represent the intangible aspects of heritage within everyday life.

Conservation ethics of working objects has developed into a complete debate in recent decades; the conservation discipline itself has evolved from simple practical repair to an industry with its own ethos and principles, governed and advised by wider bodies. As this opens up to a wide range of professionals, opinions are expressed and often argued, creating conflict over how objects should be treated. Consequently, the approach to working objects differs due to varied views on whether they should remain functional, in use, or a static object.

Some objects, such as the Creamware Lamps, were conserved and kept in working condition, which can be observed in the exhibition today.

The working objects in our collection have been appropriately conserved due to their owner's aims, the material needs and the object's subsequent values, according to traditional conservation practice. The majority of objects have been cared for with specific attention to their material needs, focusing on stabilising structural and surface conditions and rectifying major issues. This includes cleaning, repairs and reassembly of the working mechanisms. Our students also direct a great deal of attention to preventive conservation within their projects, which covers the future protection of the object, ensuring any potential causes for deterioration are monitored and mitigated. Preventive conservation is of great importance in particular with working objects in use, as care plans aim to confirm that any use of the object keeps its protection in mind and is as safe possible to prevent damage

Cavalry Sword and Scabbard (late 1800s)
Leslie and Chris Hirst
Iron, leather, wood
23/155
Conserved by Holly Pylko

Cavalry Sword and Scabbard
This sword was likely manufactured between 1885 and 1889 as the pattern on the guard matches the style of the time. Near the hilt is a manufacturer's mark (Figure 1) in which there is a stamp of a crown, the letter 'B', and the number '21'. The 'B' likely stands for Birmingham, as the place of production, while the '21' is likely the rack number. An article from Birmingham describing the process of sword production in 1874 (Figure 2). This sword belonged to an infantryman of the Black Watch named Harry Crawford Campbell. He was wounded at Passchendaele in 1917 during the First World War and was then moved to horse artillery.

Treatment
Loose surface dirt on the sword and scabbard was removed with a lint free cloth. Under a microscopic lens, a small glass bristle brush was used to remove some heavier corrosion near the base of the blade, before rinsing with deionised water. The corrosion on the guard was removed with a bristle brush as well as fine steel wool and a fine grit Garryflex abrasive cleaner. It was wiped clean with a lint free cloth before applying Renaissance wax to protect the surface. The leather of the grip was wiped clean with a soft brush and lint free cloth before using groomstick and hawthorn to get between the grooves in order to remove any loose dirt. Areas in which the leather was flaking were consolidated using 1.5% Klucel G in ethanol, applied with a brush.

The scabbard was cleaned in a similar fashion to the guard - mechanical cleaning with a dry bristle brush was used to remove loose surface dirt, after which a fine grit Garryflex abrasive cleaner was used in areas of heavier corrosion. A small scalpel was used to loosen areas of firmly adhered substrate. In small sections, using 3 in 1 oil along with fine steel wool, most active corrosion was easily removable without causing damage to the surface (Figure 3). The oil/corrosion slurry was removed with white spirit, then rinsed with deionised water using a cotton swab. Lastly, the scabbard was wiped down with a lint-free cloth, and Renaissance wax was applied to the surface and burnished after 15 minutes.

The tarnish/patina of a sword's blade should never be removed, as it contributes to the sword's history and does not damage the object. Therefore, any tarnish on the blade was left untouched.

Cab Plate – ‘Welsh Pony’ (1867)
Ffestiniog Railway, manufactured by George England and Company Ltd
Iron, tin plating, enamel paint
23/001
Conserved by Monika Czaja

Cab Plate – ‘Welsh Pony’
Originally attached to the cab side of Welsh Pony - a steam locomotive built for the Ffestiniog Railway in 1867 (Figure 1). The inscription ‘G. ENGLAND & CO.’, refers to a manufacturing company which operated since 1848. The manufacturer’s plate has been a part of the locomotive since its release, and until the early 1880s when it had likely been replaced. It was found buried in Glan y Mor Yard at Boston Lodge in 1961. While the fragile cab plate has been put in storage archives, the Welsh Pony underwent conservation works and returned to steam in 2020 (Figure 2).

The object has three main components: iron sheet, tin plating on top of the iron, and enamel paint applied over the metal plating. The corroding iron from underneath has caused some areas of loss as layers to disfigure and crumble away. If examined closer, signs of the original brass frame can be seen along the edges of the plate: a paint loss line in top right and left corner, glue residue, and general discoloration of the area.

The object has been examined and analysed through visual examination (Figures 3-10), XRF, and solvent testing. The X-ray fluorescence (XRF) analysis identified the inorganic elements present. Throughout the treatment, the cab plate was also tested on how it reacts to different chemicals and conservation-grade cleaning agents. Treatments were tested on surrogate samples to measure working time and effectiveness.

Treatment
The conservation has focused on stabilising all of the elements, as well as removing the active corrosion, stains and surface deposits and contaminants. The priority was to consolidate the flaking enamel paint. After that, the other treatments could be done safely without losing any material from the object. Consolidation was followed with rust removal, targeting the active form of corrosion. Later, different types of stains, soiling and surface deposits were targeted with specific solvents and chelating agents.

The cab plate, together with the damage and imperfections, tells a story about its history, the way it was used and the outside condition it has experienced. Therefore, the requirements for this conservation treatment did not include any physical restoration or retouching. However, to bring the object back to life, a 3D digital reconstruction was commissioned from an artist, which presents how the maker’s plate could have looked when it was first made.

Victorian Black Mantel Clock
Harry McDonell-Woods
Clock case: plaster, wood, black slate, brass details
Quartz clock: glass, brass edges, plastic hands, iron pins.
23/120
Conserved by Giorgia Cipollone

Victorian Black Mantel Clock
Victorian Mantel clocks, with an architectural design and symbolic elements, reflect the cultural and social context of the period, resonating with the values, sentiments, and aesthetics of Victorian society. These types of clocks were designed to be displayed on a mantelpiece or shelf above a fireplace. They were often decorative and served as both a timekeeping device and a decorative element in the room.

X-ray Fluorescence (XRF) was performed to understand the types of materials used to manufacture the clock: Slate: High concentration of Calcium (Ca) and Silico Oxide (SiO_2). Metal area: Copper (Cu), Zinz (Zn) and Lead (Pb).

Treatment
The mechanism was dismounted, and initial dust and residue cleaning was conducted with brushes. Warm water and pH-neutral soap, along with soft brushes and cloths, were used to clean the case, ensuring no wetting of the bottom wood panel and inner plaster structure to avoid further damage. White spirit was employed for cleaning and removing black coating and waxes, restoring the columns and frieze to their original brass colour. For more stubborn residues or tarnish, a mild cleaning solution for brass was applied with a soft cloth.

Mechanical cleaning of corrosion on the clock area, columns and pine finial was performed using a scalpel and industrial denatured alcohol (IDA). Tarnish and corrosion were also carefully removed from the back of the clock, bezel, and holding pins, using the same method and a cream solution for polishing. Previous restoration attempts were dissolved using dichloromethane gel, particularly in areas where pieces did not match the original shape. Re-joining the piece involved using a 15% acrylic resin in acetone to adhere the pieces together, while filling was done with an epoxy putty. Missing components, such as the dome base was made from a gypsum-based powder mixed to an acrylic polymer liquid. The central finial was produced from a digital drawing and 3D printed, painted, and secured with an inner metal wire and protective coating.

A solution for blacking the slate was created using waxes, black pigment, and solvents, followed by a final coat of microcrystalline wax. Additionally, a protective coat of 3% acrylic resin in white spirit was applied to the back of the clock mechanism to prevent corrosion. Retouching was carried out using black pigment mixed in the acrylic resin used for coating, and the clock was reassembled.

Unidentified Crank Powered Pully (mid 20th century)
Alford Manor House
Wood, copper alloy, iron alloy, lead, fabric
23/128
Conserved by Evan Warren Hardwick

Unidentified Crank Powered Pully
The object seems to have been assembled from disparate parts for a specific purpose, though the knowledge of what that purpose was has been lost. This means that the object is a one-of-a-kind item. The mechanism seems to have been made from a cannibalised gramophone motor. This has then been housed in a homemade wooden case and fitted with a pully to allow it to turn whatever it was connected to.

X-ray Fluorescence (XRF) was used to determine the composition of the mechanism components.

Treatment
The mechanism was removed from the case so that they could be treated separately. Then the mechanism was disassembled, the mechanism's surface was cleaned of any grease and debris, using both dry cleaning and solvent cleaning. This was done through the use of a white spirit bath and an ultrasonic bath to remove solidified grease. The surface of the mechanism was also de-corroded using mechanical means.

The mechanism was then reassembled. The case's surface was cleaned of any dirt. The split in the lid was re-adhered using fish glue. Finally, the new lower hinges were made so the lid could be reattached to the case. This was done by bending a strip of metal into a 'V' shape, then forming it around a correctly sized nail to make the hinge loop for the hinge pin to go into. Holes were drilled in the new lower hinge that lined up with the old lower hinge so it could be layered over the top of the new one. A new hinge pin was then made, by sawing the nail used as a former to size, to replace the missing one. The hinges had a 270° range of motion to allow the lid to open correctly.

To make the treatment more sustainable, microscopes, lamps, extraction, which were used throughout the treatment, were switched-off and unplugged when not actively in use.
Maintain relative humidity (RH) between 40–60% with maximum fluctuations of 5%. This will account for the wood and metal components of the object. UV exposure should be less than 75 μW/lm, and the objects should be maintained between 15–25°C with a maximum variation of 4°C. The light levels should be maintained at 200 lux.

Metronome de Maelzel (1880-1920)
Burton Constable Hall
Mahogany, Metal (bronze, iron)
21/002
Conserved by Evan Warren Hardwick

Metronome de Maelzel
The metronome is a Maelzel Metronome from between 1880-1920. The casing is made of mahogany wood and the mechanism is made of copper alloy gears as well as a bell and iron screws. Metronomes have been an important part of learning to play and playing instruments since 1815 when Maelzel first patented them. He was the first person to patent the modern metronome.

To find out the wood type of the metronome case, microscopy was used (Figure 1). To make the slide for the microscopy, a small sample of wood from the case was taken and placed on a glass microscope slide. Historical Mounting Medium was used to mount the slides, then the Dino Light was used to look at the samples. Viewing the features of the wood suggested it was mahogany.

Treatment
The mechanism was removed from the case, then degreased and cleaned of any dirt using white spirit. The missing sections of the case were constructed to match the original wood and then attached to the original case using fish glue. The failed joints as well as detached elements (Figure 2) of the case were reattached. Due to limited time, the replaced front panel was not stained to match the rest of the case.

To make the treatment more sustainable, microscopes, lamps, heaters, dryers, extraction (etc.) were switched-off and unplugged when not actively in use.

The object should not be lifted by the top, and extra support from the bottom should always be provided to reduce any unnecessary strain on the adhesive present.

This object should be kept at 40-60% Relative Humidity (RH) with a maximum variation of +/- 5% to account for both the metal and the wood present in this object. The item should be maintained between 15–25°C with a maximum change of 4°C, and the light levels should be maintained at 200 lux with an ultraviolet exposure of less than 75 μW/lm.

Enema Equipment (Victorian Est 1875-1885)
Arnold & Sons Instrument Manufactory, London
Alford Manor House
Mahogany, Silk velvet, Brass
23/133
Conserved by Lily Prior

Enema Equipment
The Victorian mahogany box contains medical enema equipment, with four brass components that make up the hand pump of the equipment. The box is missing the rubber tubing that would have been included, possibly due to dissociation or the degradation of the rubber. Victorian medical equipment, in this case enema equipment, holds great historical significance and cultural importance as it gives researchers and historians insight into the medical practices of the time and how the now dated health beliefs effected the way in which society aided illness. Throughout the Victorian era, the use of enemas became a highly popular medical procedure, which reflected the society of the time's intrigue in health and hygiene.

The mahogany wood was identified using a wood identification guide as well as comparing the object to similar enema equipment boxes from the manufacturers catalogue. (Figure 1).

XRF (X-ray Fluorescence) testing on the main metal barrel of the object, the other two pieces, and the lock on the outer box, which resulted in all metal additions showing that Copper and Zinc were the main components, allowing for the metal to be identified as Brass. (Figure 2).

Treatment
Surface cleaning was done to the interior lining of the box, which included removing larger pieces of debris and pests. A conservation-grade vacuum and a firm bristle brush were used for surface cleaning, taking care not to damage the fraying velvet.

Previous repair attempts using cardboard had caused further damage to the upper lining of the box. The warped cardboard was pulling the lining apart and allowing dirt and debris to enter behind the velvet, therefore, the old repair needed to be removed. Despite the adhesive used being unidentified, the age of the repair allowed the cardboard to be pulled away without damaging the velvet. This removal was necessary to prevent further distortion of the fabric.

Padding was inserted behind the fabric as well as small pieces of fine mesh. Using matching coloured thread, a self-couching stitch was used to bring both areas of torn fabric together. The brass elements of the equipment were surface cleaned with a Synperonic solution, which removed the dull haze from the surface. The recesses and badge areas were cleaned in detail to remove the black, solidified dirt that had built up in the details of the brass.

Veterinary Box (1914)
Osmond & Sons
Pine Wood, Leather, Iron, Brass.
23/116
Conserved by Sophie Drye

Veterinary Box
This is a veterinary box from 1914, intended to aid farmers in treating their livestock without intervention from professionals, aiding home remedies. It contains 3 glass bottles that once held these treatments, and the internal label shows that these came as a set.

The varnish layer of the wood prevented visual identification, so DinoLite was used to investigate, where the resulting identification of resin canals and grain contrast concluded that pine was used. Identifying the leather was difficult as the surface was damaged from use, so could not be used as a reliable source of identification. The iron and brass hinges and nails were identified with magnets, colour and XRF element identification.

Treatment
Foam was used to create places for the glass bottles to sit. The storage was designed as adjustable, with free space so that the owner could increase their collection if necessary. The internal label was lifted, and a syringe was used to add diluted EVA as another brush spread the EVA before laying it down on the wood, preventing leaking. A sheet of melinex was then placed on top to prevent adhering a wood cutoff to the paper, as this was used to distribute a metal weight.

A wood prop was created for this process, as the lid would be open for a significant amount of time. To fix the split in the wood, a spatula was used to lift the wood and insert a toothpick. This created a gap for the fish glue to be spread. Toothpicks were used again to lift the outside label, as it gave clear access to spread the EVA without any risk of damage from the syringe needle. Initial attempts at trying to apply adhesive to the leather were unsuccessful, therefore it was cleaned with white spirit.

Scrap leather was then cut and applied in the gaps. A layer of fluid matte medium was applied to counteract the darkening of the leather from BEVA adhesive, then renaissance wax was applied. Finally, supports were added underneath to protect the leather strap from damage during moving, and another layer of foam was added internally so that the bottles would not get jostled during moving if the owner is taking it back.

Creamware Lamps (1970's)
Royal Creamware Ltd.
Ceramic body with brass and flocked base.
22/035
Conserved by Sophie Drye

Creamware Lamps
Creamware lamps in this Victorian style were made to give a home a sense of elegance and were used as decoration as well as function. These lamps are believed to have been made in Leeds, Stoke on Trent, or Goole in the 1970's by Royal Creamware Ltd. The manufacturing processes used range from slip casting to crosshatching, but the treatment focuses on repairs to a previous treatment undertaken by the owners' friend.

Treatment
Removal of the superglue on the Griffin lamp begun with suggestions to use Paramose to swell the superglue and aid its removal between broken pieces, following tests with different solvents such as acetone which were unsuccessful. The glue removal was undertaken by soaking Paramose in cotton balls and placing them on joins, with goggles, gloves, the fume cupboard, and a closed environment for the lamp, but was ineffective and came at a cost. Leaking caused the Paramose to affect the base of the lamp and the base lost some of its surface. This was fixed over multiple trials and was even redone.

The Mermaid Lamp begun treatment in 4 separate pieces. Treatment resolved this issue using Paraloid B72 diluted with acetone to adhere the pieces and then filling in areas of loss with Araldite 20/20, epoxy resin. Araldite was also used with losses in the other lamp. These were thickened with fumed silica to prevent sink holes, and some areas needed multiple fills.

The owners were clear in their wants for the pair of lamp bases to be placed back in their guest bedroom upon completion of treatment. The recommendations of storage must consider their resources, as the lamps will not be under museum or lab conditions. As a result, any appropriate guidance should be cost effective and consider the personal time of the owners. The owners are recommended to clean with care between the griffins and the internal components and place the lamps more central on any surfaces to prevent falls. LED bulbs should be used to reduce irregularities in temperature in the brass socket. Nitrile gloves, while often used in conservation, are irrelevant or unnecessary due to the object use in the owner's home.

Nativity Figure – Joseph (c. 1940-50s)
St. Paul's Church, Finchley
Plaster of Paris
24/035
Conserved by Madeleine Fox

Nativity Figure - Joseph
Plaster of Paris figurines were popular during the mid-century modern period as a cheap alternative to porcelain. The manufacturing process consists of pouring liquid plaster into a premade mould and inverting it to allow excess plaster to drip out, creating a hollow object. A metal wire support was inserted during manufacture to provide additional strength. Traditionally, plaster of Paris figures were painted with oil or watercolour paints.
The figure is from a Nativity set of 12 pieces, used by the church every year in the lead up to Christmas to symbolise the preparation for the birth of Jesus.

Treatment
The figure was coated in a thick layer of varnish in a previous repair, which was identified under UV light. The colour that it fluoresced indicated the type of varnish used. In this case, pale green suggested natural resin or aged synthetic resin (Figures 1 and 2). The aged varnish was removed by gently scraping and lifting away with a sharp scalpel.

To determine the location of the metal support, the figure was x-rayed (Figure 3), showing that it ran deep into the body of the figure, suggesting it was added during manufacturing rather than in a past repair. Exposed wire was removed with wire cutters and the excess filed down. The missing area of hair was modelled in plasticine and a mould was taken using Imprep dental putty. Plaster was poured inside the mould, pushing it deep into the crevices to remove air bubbles. When dry, the plaster was removed, sanded smooth, and adhered to the figure with Paraloid B72. The whole head was reattached to the body with Paraloid B72.

The old hand was removed and a new one modelled in plasticine based on the size and shape of the other hand on the figure. The process for modelling the new hand followed the same steps as outlined above for the head. The new hand was sanded to fit on the figure flush and adhered with Paraloid B72.

Areas of loss were filled with Polyfilla and sanded smooth using increasing grit sandpaper until they were indistinguishable when running a finger across the surface. Acrylic paints were used to colour match the fills. Thinned paint was used to blend the varnished and unvarnished areas to create a cohesive finish.

Salt Glazed Stoneware Spirit Barrel (18/19th century)
Celeste Sturgeon, private
Stoneware ceramic, boxwood, hardwood, cork, paper
23/109
Conserved by Dafydd Williams

Salt Glazed Stoneware Spirit Barrel
Due to the lack of potter's mark, it is difficult to know for certain the history of the spirit barrel. The barrel's mottled (orange peel) appearance and vitrified body indicate that it is salt glazed stoneware. Initial production centred around kitchen/homeware ceramics, but production of commercial and industrial wares soon followed, including the spirit barrels that were produced for the transport and sale of spirits in pubs.

Although it may have originally been manufactured as a piece of utilitarian ware, it is now appreciated for the skill of its manufacture and aesthetic charm as items of nostalgia due to their association with the value of social gatherings.
The wooden stopper top and tap were turned down from blocks of wood on a lathe and assembled. Watertight seals were made by pushing solid cork into the tap holes before hollowing out the centre.

Viewed through a stereo microscope, the break edge of the ceramic fragments can be seen to have very few pores and grains, and the glaze layer has fused completely to the ceramic body (Figure 1). These are all indicators that the ceramic was fired at a high temperature. Features of the wood indicated it was made from a hardwood such as cherry, oak or mostly likely boxwood (Figure 2).

Treatment
The first priority was adhering running cracks in two of the larger fragments so they could be handled without the risk of causing further damage. This was done using a low viscosity adhesive, Araldite 2020.
Once safe to handle, loose surface dirt was removed. The glazed outer surfaces were solvent cleaned with the non-ionic surfactant Synperonic A7 and acetone to remove the well-adhered dirt and greasy deposits. The dirt and mildew on the inside of the ceramic was steam cleaned (Figure 3).

The fragments were adhered using the dry stick method (Figure 4). Once all the fragments were correctly aligned, Araldite 2020 was introduced into the joins (Figure 5). Once assembled, the impact point could be seen where either the ceramic was hit by something or more likely dropped (Figure 4) and some losses were visible. They were filled using a two-part epoxy putty, polyfilla or Araldite 2020. The fill mediums were toned using dry pigments to colour match the ceramic body to aid in retouching the fills then retouched with urea-aldehyde resin binder and dry pigments.

Painted Reverse Glass Print (circa 1804)
Jim Cheshire, private
Crown glass, natural resin varnish, paper, ink, oil paint
19/039
Conserved by Dafydd Williams

Painted Reverse Glass Print

Reverse painted mezzotint glass print, dated April 4th, 1804, produced by W.B. Walker printmakers in London. These were briefly popular circa 1800 and were produced as a cheap alternative to oil paintings, with the final painting of pre-made mezzotints advertised as a leisure activity for middle-class women. The object is a monochrome mezzotint print adhered to a sheet of glass using a natural resin varnish (image down), the back of the print is painted to create the final polychrome object (Figure1).

UV microscopy (Figure 2) and multispectral imagery identified the varnish that adhered the print to the glass. The recto of the image was viewed under ultraviolet light, the layer between the glass and oil paint fluoresced a milky pale blue/green colour, characteristic of traditional natural varnishes such as damar, mastic and Venice turpentine (larch) (Figure 3).
Spectrophotometry curves (Figure 4) and XRF were used to compare and identify pigments, which confirmed that all but the blue areas contained toxic materials.

Treatment

The glass recto (image front) and oil paint verso (image back) were cleaned before assembly. Loose dirt on both sides was removed, the glass plate recto was cleaned using cotton swabs and Synperonic A7. Finally, the glass surface was cleaned with IDA and rinsed with distilled water to remove any Synperonic residue.
Due to the curved distortions of the glass plate (Figure 5), it could not be assembled and adhered flat so an adjustable easel was used instead. With the aid of gravity, the break edges could align and lock into place over several days. There was one large area of glass lost, and a new piece was cut and partially adhered in place for reversibility (Figure 6).

Areas of the painted print were lost along the break edges and required retouching. After testing watercolours, gouache, and traditional artist paints, and discussing options with other students, a solution was finally found, and paints were produced using the synthetic resin Regalrez and dry pigments, which are retreatable in a solvent that did not affect the original paint or varnish layers.
Retouching of the large fragment was completed using the Tratteggio technique, wherein paint is applied in small lines using a colour pallet similar to the areas surrounding a loss. The aim of the technique is to make the areas of loss less distracting to the viewer, but that the retouching is visible on close inspection.

Historic Reproduction

Using the techniques described in Salmon's, Polygraphice, or, the arts of drawing, engraving, etching, limning, painting, varnishing, japaning, gilding (1701), a surrogate painted reverse glass print was made using the traditional techniques.
A sheet of modern 1.5ml glass was selected as an analogue surrogate, which unlike the original glass did not have the curvilinear distortions. Traditionally, crown glass sheets were produced by first blowing a glass ball, flattening and spinning it – the centrifugal force spreading the glass outwards and causing ripples. The glass sheets were then cut from the large discs, with the cheapest glass sold cut from nearest the centre with the most distortions.
The print used for the surrogate was produced using a linocut rather than a mezzotint, which is produced from a burnished copper plate. A linocut was chosen due to the limited amount of time available for creating the print, and although less detailed than the original, both prints were created using an oil-based ink and printing plate.
Linseed oil-based intaglio ink was used as the recipe hasn't changed much over the centuries. It is produced by dispersing dry pigments in copperplate oil, which is produced by burning linseed oil until a viscous resin is produced.
Initial testing was done using modern linen paper; however, the quality was not high enough to be used on the final surrogate. The linen fibres in the paper were longer than would have traditionally been used, which resulted in the paper not being removable later in the process. After further testing, it was decided that a higher quality contemporary cotton rag printmaking paper would be more analogous to the paper originally used.

Varnishing the glass

Venice turpentine is a highly viscous resin produced from larch tree sap and is used to adhere the print to the glass sheet. The resin was warmed in a double boiler until it softened and was applied to the glass sheet with a pallet knife.
Applying the print
The print was soaked in room-temperature water for two hours until fully saturated. The print was then removed from the water, placed between two pieces of blotting paper and all the surface water removed. While still damp, the print was placed image down on the varnish.
The back of the print was again wetted and rubbed using a soft sponge and the paper removed until the print was satisfactorily transparent, leaving a thin layer and the inked image. The print was allowed to dry and remained too opaque, so a second layer of mastic varnish was applied using a brush. Mastic varnish can be thinned in a solvent that would not disturb the original varnish layer.

Painting the print

The back of the print was painted using oil paint, however after several failed attempts to paint it face down, a mirror was placed in front of the print so that it could be seen by looking over the print as the paint was applied to the back.

Long Time, No See

Each object has a different story to tell, influenced by a wide range of people. From the people who prepare the parchment, clay, and textile fibres, to the people who create the objects, to the original owners and the thread of people who have been involved in bringing the objects to Lincoln for conservation, to the 17 conservators who are now completing their BA degrees, to yourselves, our lovely visitors.

Everyone who has ever come into contact with these objects will have had their own experiences; deep sentimental memories of owners, to the practical processes carried out by the manufacturers, to the focus and dedication involved in conserving them, to learning about and celebrating our achievements here at Long Time No See, to the upcoming return of objects to their owners ready to continue their journeys.

As our own journeys at Lincoln come to an end, we would like to thank the wonderful staff who have helped us along the way, starting wit the academic staff who have supported us with our dissertations, object treatments, assessment questions, module queries, and so much more.

Henning Schulze, Caroline Oliver, Bridget Warrington, Leah Warriner-Wood, Cathy Daly, Chris Pickup, Philip Skipper, Claire Ridley, Celeste Sturgeon, Melina Smirniou, and all of the other staff who have all been so incredibly kind and supportive throughout our time here.

An extra special thank you goes to Lynda Skipper who has also been our personal tutor since first year, and to Jim Cheshire who stepped in during the first half of third year while Lynda was on research leave.

And last, but no means least, a huge thank you goes to our incredible lab technicians, Josephine McKenzie, Emma Bonson, and Jo Wright, as well as Chris Robinson who retired earlier this year. Without them, the labs would not run anywhere near as smoothly as they do.

This exhibition is a testament to the fact that humans have created and cared for as long as we have existed and will continue to do so long after we leave.

Please feel free to leave your own thoughts and messages in our visitor book and join us as part of the interconnected web of experiences and memories these objects hold.