Katrina van Grouw

First aid at the front line

Introduction

The ornithological collections of the Natural History Museum are housed at Tring, in Hertfordshire, in a building adjoining The Natural History at Tring – formerly the Walter Rothschild Zoological Museum. They were moved to this location from South Kensington in the early 1970s and have benefited from being housed in purpose built accommodation with room for expansion. However, damage as a result of inefficient preparation and/or frequent handling does occur.

Since 2003 the Natural History Museum (NHM) bird collections have benefited from an intensive remedial conservation programme, with 500 – 700 specimens repaired each year. A variety of innovative techniques have been developed to deal with various categories of damage and in all cases conservation measures are fully documented. Where repair is impossible or impractical, specimens are sealed within polythene bags or tubes. Appropriate preparation methods and collections management practice reduce the risk of future damage sustained to the bird skin collection.

Categories of damage faced by specimens

1. Mechanical

The term 'mechanical' damage is used to describe breakages to a specimen which is otherwise in good condition and not weakened by chemical or environmental factors. Invariably this is a result of careless or frequent handling over a prolonged period, or poor curatorial practice such as overcrowded storage space. The following recommendations for avoiding incidents of mechanical damage should be considered when establishing best practice:

- Curation
    1. Visitors' experience of handling bird skins should be ascertained before access to the collection is given, particularly if biometric measurements are to be recorded. Instruction should be offered if required.
    2. Visitors should be advised not to attempt to handle more specimens than they can comfortably examine in the time available. This is particularly appropriate in cases where bench fees are being levied and the visitor is therefore under greater pressure to work quickly.
    3. Specimen labels should be attached in a way that enables both sides to be examined easily without placing excessive strain on the legs.
    4. Specimens should be arranged neatly in cabinet trays with sufficient space between each tray.

However, the way a specimen is prepared initially will also affect its stability. Specimens prepared without due consideration for storage and handling requirements may be more vulnerable. The following recommendations may significantly reduce the likelihood of future damage:

- Preparation

1. Position wings to allow access for necessary measurements to be taken.
2. If spread wings are prepared, detach these and store separately to avoid damage.
3. Large-headed birds such as macaws should have their head facing sideways to avoid placing unnecessary strain on the neck when placed on their ventral surface.
4. Long-billed birds should be prepared in a way that enables them to be stored in a space-efficient way without risk of damage to protruding mandibles.
5. Prepare tails with half the feathers spread to allow easy inspection without excessive handling.

The majority of specimens that have suffered only mechanical damage, with no degradation to the skin from other causes, will benefit from remedial conservation and survive continued handling.

2. Environmental

Environmental factors include the long term detrimental effects of a variety of environmental conditions, including lack of pest control procedures, high or fluctuating temperature or humidity and exposure to dust and other contaminants. In all cases the priority is to eliminate the cause of damage and halt further deterioration.

3. Chemical

Chemical damage includes the internal, irrevocable deterioration of the skin caused by the use of inappropriate preservatives, or poor preparation. Examples include the use of alum which will cause the skin to become brittle and flaky, or the oxidisation and acidification of residual fat left on the skin during preparation – a condition known as ‘fat burn’.

The specimen will often show no visible signs of damage until a wing or tail has become detached and is brought to the curator’s attention. The tail may become detached as a result of a localised form of fat burn caused by the incomplete removal of the preen glands. A gentle squeeze will reveal the body to feel soft and ‘spongy’, indicating that the entire specimen has already reached an advanced stage of fragmentation. The interior of the skin will take on a yellow or orange colouration and may be powdery or crumbly in texture. Feathers are arranged in groups called tracts, and the gaps between them are called apteria. Usually the skin cracks between the feather tracts and along the apteria, causing the feathers of the flanks, shoulder and mantle to come away as large isolated sections. The upper breast usually breaks into much smaller fragments, with individual feathers or small groups of feathers and their associated skin particles becoming readily dissociated.

At the present time there is no technique for reversal of damage caused by fat burn, though the useful ‘life’ of the specimen can be prolonged through careful consolidation of the fragments using conservation grade adhesives. More precise estimates of longevity after repair require further research.

Materials and Methods

Materials used for skin repair

Conservation grade materials are used wherever possible in order to provide some guarantee of their long term stability and colour consistency. Reversibility is not particularly an issue; due to the delicate nature of damaged bird skin, any efforts to remove or reverse adhesives would in most cases cause greater damage. However, it should be remembered that the overwhelming majority of historical bird skin specimens are prepared using a variety of materials of particularly poor conservation value such as wood products and non-galvanised metal. Bird skins have a finite lifespan and a balance should be reached between historical integrity and the necessity of maximising the research potential of the specimen.

The adhesive Paraloid B72® (ethyl methacrylate (70%) and methyl acrylate (30%) copolymer) is particularly effective. This can be purchased in both bead form and ready-made. If used in bead form it may be dissolved in Acetone in small quantities as and when required, to the desired consistency. Glass Micro Balloons can be stirred in to form a creamy paste suitable for use as a filler.

Repair methodology

Re-attaching wings

This is invariably a very simple repair to undertake. The wing is held in place and one or more stitches using cotton thread passed through the body and out through the bones of the forearm and back again, before being tied off at the body where the curved contour feathers can be easily lifted over the knotted ends to completely conceal them (Fig. 1). The flatter wing coverts can similarly be lifted with the point of a needle to cover the stitches. It is important to sew far enough back towards the ‘elbow’ joint to allow a wing measurement to be taken without obstruction (Fig. 2).

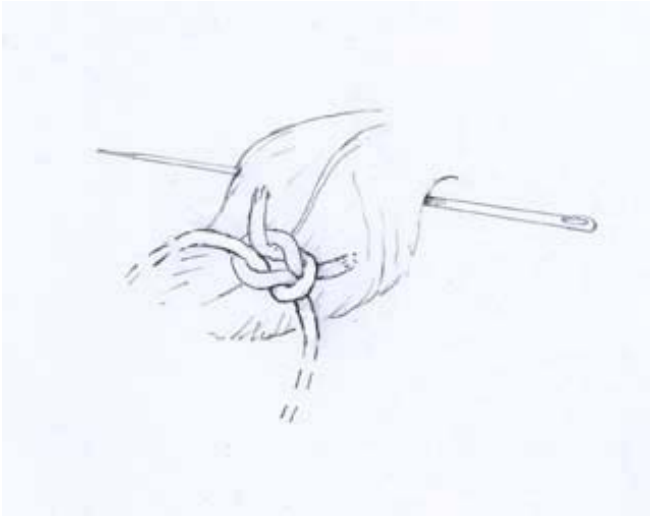

Figure 1: The curved contour feathers on the breast can be easily lifted over the knotted ends of thread to completely conceal them.

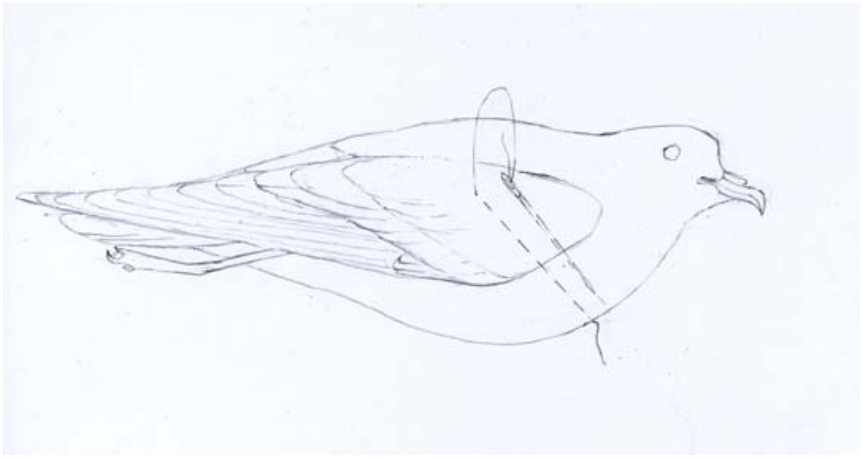

Figure 2 Re-attaching a wing.

Re-attaching the tail

A combination of a single stitch with adhesive, such as Paraloid B72, is generally effective. A length of thread is tied securely to the base of the tail, leaving a trailing end of several inches. The other end is threaded onto a needle, passed through the body, then out through the breast and back again, and tied securely to the trailing end at the correct distance from the body (Fig. 3). Alternatively, two threads can be attached and passed through the body and tied together on the breast, using the above method.(Fig. 4). Sideways movement can be eliminated afterwards by the application of a small quantity of adhesive injected at the base of the tail with a syringe in order to anchor it in place. The skin should be placed head-downwards in a vertical position whilst drying.

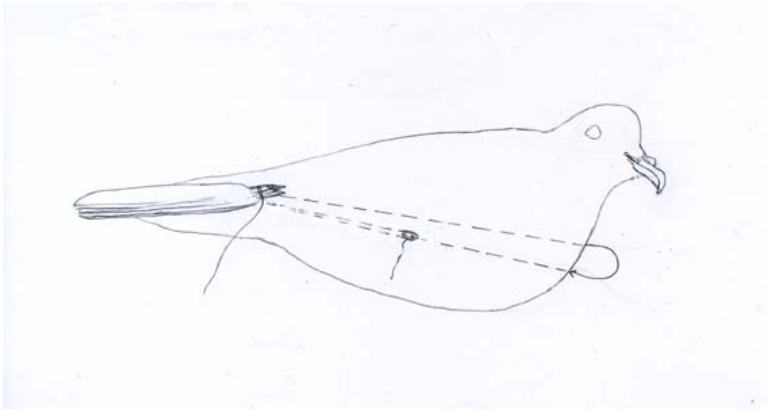

Figure. 3 Re-attaching the tail.

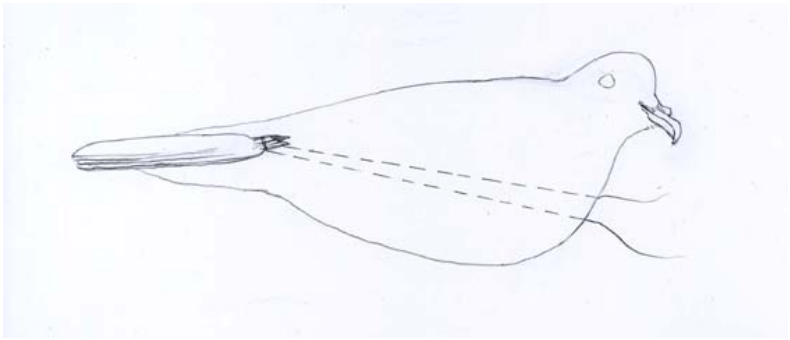

Figure. 4 Alternative method for re-attaching the tail.

Re-attaching legs

The single stitch described above under reattaching the tail can also be used for re-attaching legs which have broken off close to the body leaving a hole in the skin. The thread is tied to the top of the leg or protruding section of bone which is pushed back into the skin (Fig. 5).

Where both legs are detached the two threads can be tied together on the breast itself without passing the stitch back through the body (Fig. 6). This is especially useful when the legs are tied together. Although simple, the repair is surprisingly effective and at least as strong as an undamaged specimen.

Snapped legs can often be mended by inserting a section of galvanized wire into both ends of the broken bone which is fixed in place with adhesive.

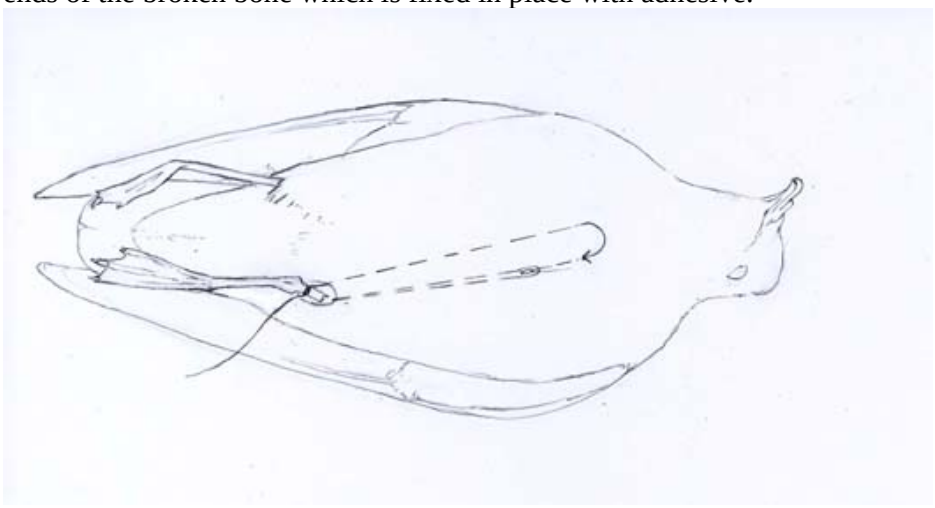

Figure 5 Re-attaching a leg

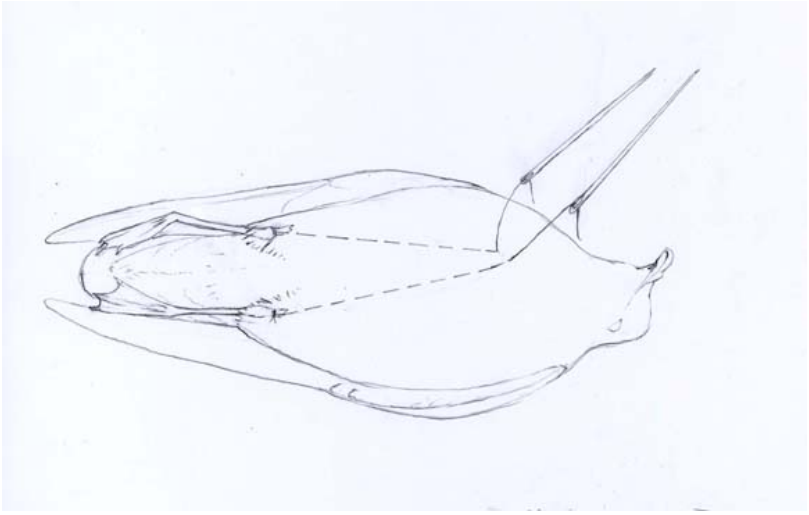

Figure 6 Re-attaching pairs of legs.

Re-attaching the head

Repairing a broken neck or completely detached head represents a series of more complex problems requiring a degree of flexibility and improvisation depending on the location of the break and the initial method of preparation. The majority of small specimens can be repaired using adhesive alone, whilst larger or long necked birds may require a supporting stick or wire to be carefully inserted into the body and head and anchored with adhesive or filler to provide a stronger repair.

Consolidation of fragmented skin

Fat burn will inevitably result in the complete destruction of a specimen through disintegration and fragmentation of the skin. There is no widely known method by which the chemical processes responsible can be reversed or halted but it is possible to bind the skin fragments together allowing for continued handling and use of the specimen. This involves injecting a solution of Paraloid B72 at various points beneath the skin and allowing it to spread to bind the fragments together. Care is required to avoid the adhesive seeping between the fragments and contaminating the feathers. The solution can be varied ad-hoc according to the viscosity required. Because of the danger of seepage between the fragments, and the problem of reversal once the adhesive has penetrated the feathers, extreme caution should be exercised and important specimens only attempted after some experience has been gained. It is advisable to work slowly, injecting only a few millilitres of adhesive at one time, gradually covering all the damaged areas.

Alternatively the specimen may be sealed in a polythene tube or bag to prevent feathers and fragments from becoming dissociated or lost.

Repair programme at NHM Tring

A single curator, with a background in taxidermy, is currently responsible for undertaking all repairs to the bird research collection.

All visitors using the collections are asked to highlight specimens in need of repair. Each visitor is issued with a repair form on arrival and asked to record the specimen,

its registration number, location within the collection and the known damage. Specimens and forms are deposited with the curator and wherever possible the repair is carried out immediately and the specimen returned directly to the visitor for re-incorporation into the collection.
Ideally, specimens are repaired and returned to the collection within a week or two. However, if too many specimens are highlighted for repair at any one time, some can be temporarily sealed within polythene sleeves or in bags and returned to the collection to be repaired at a later date.
Rarely, fat burned specimens are too badly fragmented to be successfully repaired, or repair attempts are judged to potentially cause additional damage. Examples of this are through seepage of adhesives onto plumage, or the skin being insufficiently strong to bear the weight of a re-attached part without tearing further. The repair of specimens of particularly high scientific value such as type specimens or those of extinct and endangered species should only be attempted when success is certain. These are also sealed within polythene tubes and annotated with a recommendation that repair should not be attempted.

Documentation

Action taken is recorded on the form issued to visitors, along with the date of repair and initials of the curator / conservator. The majority of repairs follow the same basic principles described above and action is recorded simply as ‘sewn’ or ‘sewn and glued’. In cases where adhesives other than Paraloid B72 are used, this information is recorded as well. Concentrations are adapted on a case by case basis, so this information is not recorded. More experimental techniques are documented in detail in a notebook, together with a full condition report and an objective assessment of the results. A photographic record is also kept in such cases.
As software becomes available, remedial conservation procedures will be fully documented electronically on the NHM collection management database system.

Conclusion

Bird skin specimens in scientific reference collections and mounted taxidermy intended primarily for exhibition pose specific challenges for the curator/conservator. Large numbers of skins can present problems of storage and regular invasive handling, such as taking biometric measurements, can put considerable strain on specimens. Shortcuts taken in the initial preparation and the use of inappropriate preservatives will also cause skins to turn brittle or naturally disintegrate over time.
In the past, such damaged specimens have often been disposed of, and a deplorable amount of historical data has been lost as a result. The repair of some specimens may be impossible or impractical and in severe cases the only option may be to preserve the fragmented remains safely together.
At Tring, an attempt is made to repair all damaged specimens and a wide range of techniques has been developed to deal with the majority of cases. The emphasis is on extending the useful ‘life’ of the specimen for ornithological research. While this falls outside the usual remit of both conservators and taxidermists, every effort is made to carefully document the action taken and materials used; paying particular attention to the long term effects of those materials on the specimen.

The aim of this paper is to demonstrate simple methods by which to minimise damage, slow the process of deterioration, undertake simple repairs and to manage a repair programme.

Biography

Katrina van Grouw shares a curatorial position with Hein van Grouw at the Natural History Museum's ornithological reference collections based at Tring in Hertfordshire. Both have a background in taxidermy (as well as ornithology and aviculture). Their job involves caring for the collection of three quarters of a million bird skin specimens, preparing new skins, and making repairs to damaged material. Katrina has an outside profession as a bird artist, and is currently working on a book of anatomical drawings. She has also written a book on the history of bird art.

Contact address

Katrina van Grouw MA(RCA)
Bird Group, Department of Zoology
The Natural History Museum
Tring, Herts. HP23 6AP
England.
k.van-grouw@nhm.ac.uk

Materials and Suppliers

Paraloid B72

Conservation By Design
Timecare Works
5 Singer Way
Woburn Road Industrial Estate'
Kempston
Bedford
MK42 7AW
Telephone: (01234) 846300
Fax: (01234) 852334
Email: info@conservation-by-design.co.uk