

PREPARATION OF BIRDSTRIKE REMAINS FOR IDENTIFICATION

Roxie C Laybourne and Carla Dove
(presented by Carla Dove)
Smithsonian Institution
Division of Birds
NHB E-605
Washington DC 20560
USA

ABSTRACT

A standard technique of preparing birdstrike remains for identification has been developed at the Smithsonian Institution (USNM). This technique is also used to identify species involved in US customs and wildlife law enforcement cases, ecological studies of prey remains, anthropological studies, determination of food contaminations, forensics studies and in systematic studies of birds. The USNM receives 300-500 fragmentary identifications per year with 99% of the cases identified to species. We feel that the careful cleaning process and proper microslide preparation that has been developed at Smithsonian is the key to our high rate of identifications.

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MATERIALS AND METHODS

Materials needed:

Microslides 25 x 75 mm
Coverslips 25 x 50 mm or 22 mm sq.
Flo-Texx mounting medium (Lerner Laboratories)
Xylene
Ivory Beads, LUX or other gentle powdered soap (not detergent)
Mesh strainers: 1 mm mesh, 83 cm x 93 cm diameter
1 mm mesh, 45 cm x 73 cm diameter
0.5 mm mesh, 33 cm x 60 cm diameter
Beakers, various sizes
Hand dryer, electric fan or compressed air facility

1. WASHING

Bird remains must be washed if sufficient material is available. A small amount of soap is dissolved in warm water. Ivory beads (brand name) works best. A comparable product available in the United Kingdom is LUX flakes. The warm water induces the damaged feather to assume the natural shape which gives a better idea of the original size and appearance of the feather. The solution should be changed until feathers are

clean. Rinse in warm water until all soap is removed. If feathers are attached to tissue, they must be left to soak until the remains are soft enough to separate the feathers. If there is not enough material to wash, pick out downy barbules and place directly on glass slide with xylene. Save all fragments that are not downy for macroscopic comparison.

2. DRYING

Place feathers on absorbent paper towels to remove as much of the water before hand drying. After towel drying the feathers are placed into the appropriate size mesh strainer. The strainer is then turned upside down onto a petri dish and the feathers are fluffed dry through the mesh using gentle blows of compressed air. A hand dryer or compressed air is used to **gently** dry fragmentary feathers. Feathers such as primaries and large contour feathers can be hand-held while drying. Care must be taken not to tangle the plumulaceous barbules when drying. This is especially true with Falconiformes, Galliformes and Strigiformes. If feathers can be contained an electric fan may also be used for drying. Often only a few fragments are available and extreme care must be taken to preserve every barb. Experience shows that different species react differently to the drying process. Some species (eg. Anatidae) can be handled more vigorously while birds of prey and galliformes, which have long barbules, require very gentle care when drying.

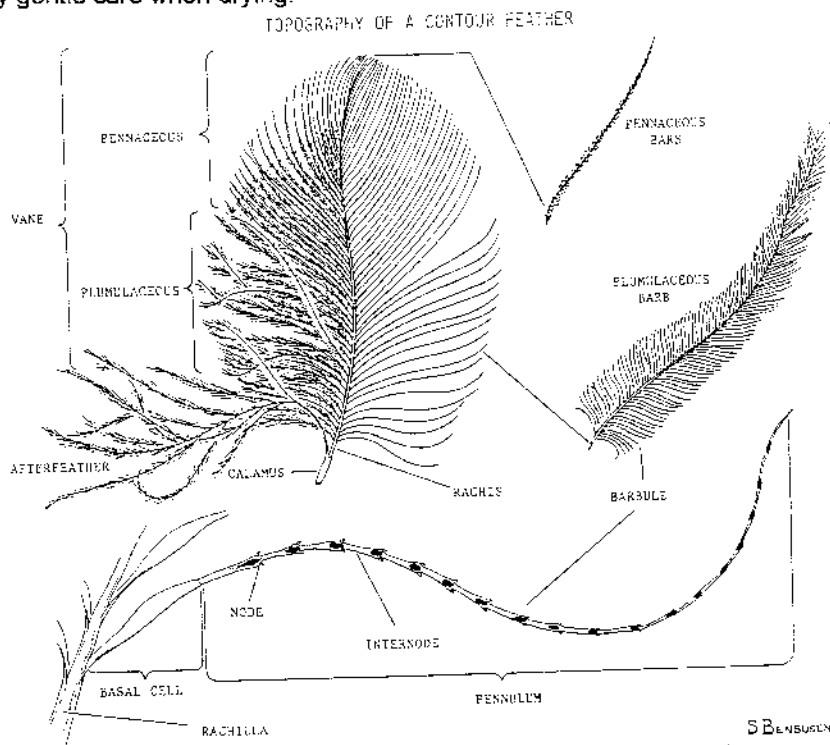


Figure 1. Topography of a contour feather.

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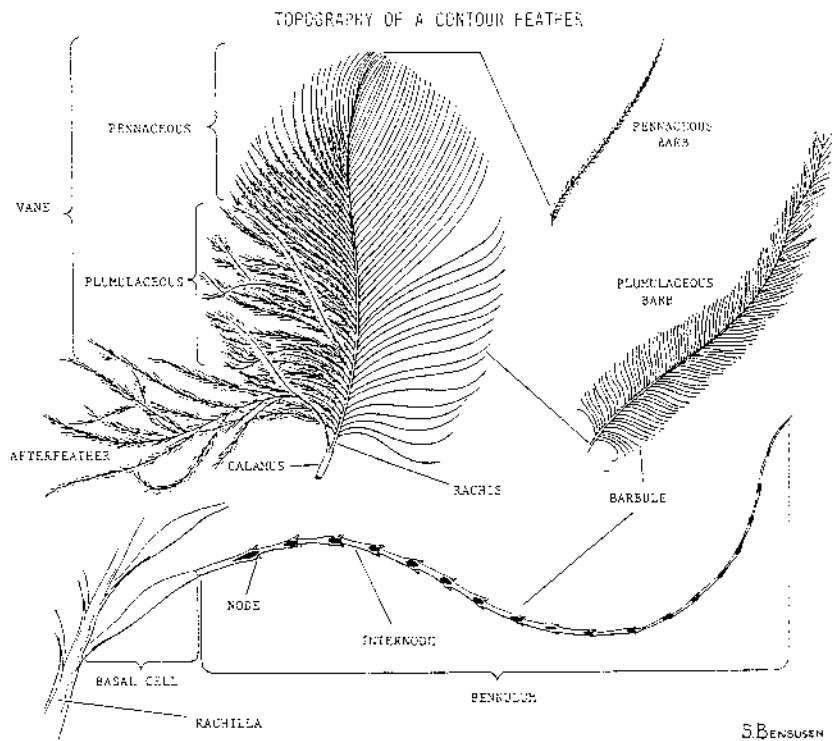
3. MICROSLIDE PREPARATION

Identification of feathers is based on macroscopic comparison of color, shape, texture and pattern with specimens in a research collection and if necessary, analysis of microscopic characters of the plumulaceous (downy) barbules to a reference microslide collection of known species. Figure 1 shows the parts of a contour feather.

Microslide preparation is straight-forward and requires minimal materials. This method is a result of years of experimentation with various mounting media and preparation techniques. The microslides that are kept in the reference collection are prepared the same way as unknown samples and remain in excellent condition for many years.

1. Place a thin aqueous layer of xylene on a pre-cleaned microslide. This allows barbules to spread apart and facilitates microscopic analysis. The xylene also dries quickly.
2. Remove plumulaceous barbs from feather or search for downy barbs in fragmentary sample. Place as many barbs on the slide as room will allow as these barbs vary according to position on the feather and part of body. This will allow for analysis of the amount of variation in the feather sample.
3. Allow xylene to dry or tilt slide so excess xylene runs off. Excess xylene can also be removed by using a small piece of filter paper to absorb the undried xylene.
4. After the xylene has dried, place enough Flo-Texx mounting medium on the slide to cover the feather sample. If barbs and barbules are short the square coverslips work best and allow room for multiple mounts on the same slide. Flo-Texx (methacrylate copolymer 37.5, butyl benzyl phthalate 2.3, 2,6-di-tert-butyl-p-cresol 0.3 percent by volume) is a brand named mounting medium that has the same refractive index as water. Flo-Texx is available from Lerner Laboratories, 171 Industry Drive, Pittsburgh, PA 15275 USA.
5. Gently place glass coverslip over Flo-Texx to avoid air bubbles. Let slide dry before microscopic examination. Dried slides provide better resolution.

Experience has shown that patient, gentle drying of feathers and the proper mounting medium are the most important factors in preparing birdstrike remains for identification. Without the proper mounting medium, the microscopic resolution of the plumulaceous characters is not adequate to make detailed comparisons of feather samples. Microslides are examined with a comparison microscope. The light microscope, with properly prepared slides, is the best method for analyzing microcharacters. For detailed research the Scanning Electron Microscope (SEM) can be used to help understand the surface features of feathers. SEM is not necessary for birdstrike identification. For preparation information concerning scanning electron microscopy see Laybourne, et al. (The Auk: 109(1): 195-197, 1992.)



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