The quality of identification: a microscopic key to the determination of feather-remains.

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The statistics of bird collisions are distorted by an enormous bias (see lecture Buurma/Brom, WP 20):

1. Outsiders (non-ornithologists) can recognize only a few species of birds.
2. The chance that remains of conspicuous birds are found is much greater than for those of smaller birds.
3. Remains of collisions on airfields are much more frequently found than those of collisions "en route".

As it is very important to find out which species cause which damages, the Royal Netherlands Air Force attaches great importance to the correct identification of bird remains that are collected after collisions. In order to improve existing methods of identification, a study was made from January 1978 until August 1979.

During the last twenty years it was tried to identify feather-remains at the Zoological Museum, Amsterdam. They were examined on shape and structure in order to establish whether they are wing-, tail-, or body-feathers. On account of the colour and size the potential species were established. Then the feathers were compared with bird-skins from the collection of the Museum.

Skins of Redwings (Turdus iliacus) and Song Thrushes (T. philomelos) at the Zoological Museum, Amsterdam.

The results of this macroscopic identification are given in table I.

Table I Some identification-results in the sixties.

	I960		I966-68	
species	9	I3%	45	I6%
probable species	4	6%	-	-
family	20	28%	63	22%
probable family	4	6%	-	-
unknown	34	48%	I74	62%

In order to reduce the high percentage "unknown", a microscopic study of feathers from 350 bird-species was made. The technique of making preparations of feathers or feather portions is simple and does not take much time: the feather portions are mounted dry under a coverslip. Only the most basal portion of a feather is taken (see figure I and 2).

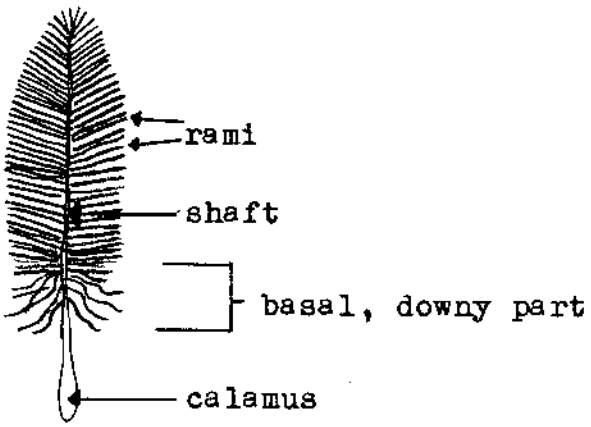


Figure I

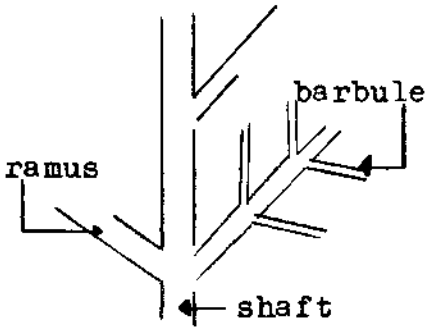


Figure 2

At the barbules (see figure 2), the characters on which groups (or species) of birds can be separated are to be found; to mention some:

- presence of prongs at the barbules (figure 3)
- barbules whether or not distinctly subdivided into nodes and internodes (figure 4)
- distribution and shape of the nodes (figure 5)
- presence of multiple nodes (figure 6)
- presence of villi (outgrowths) at the bases of the barbules (figure 7)
- lenght of the barbules
- number of nodes per mm. barbule

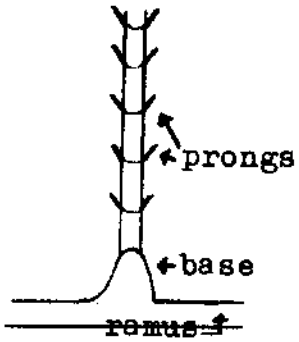


Figure 3

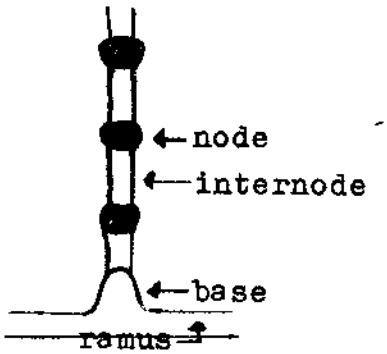


Figure 4

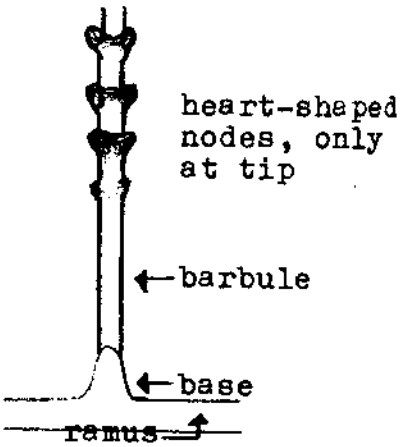


Figure 5

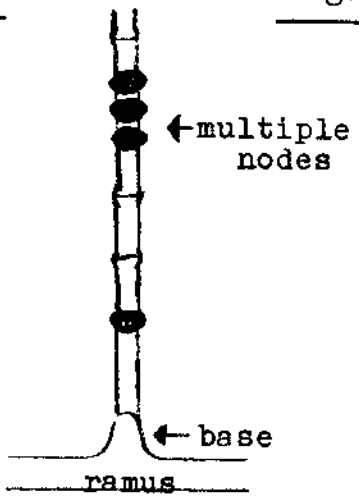


Figure 6

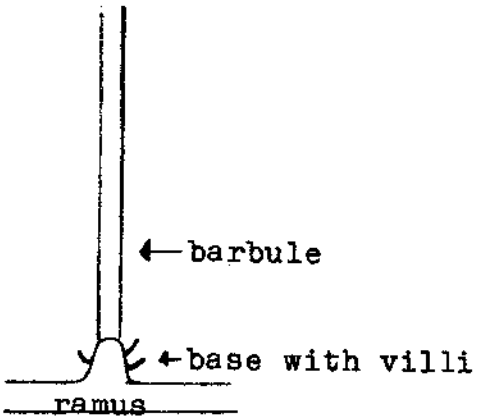
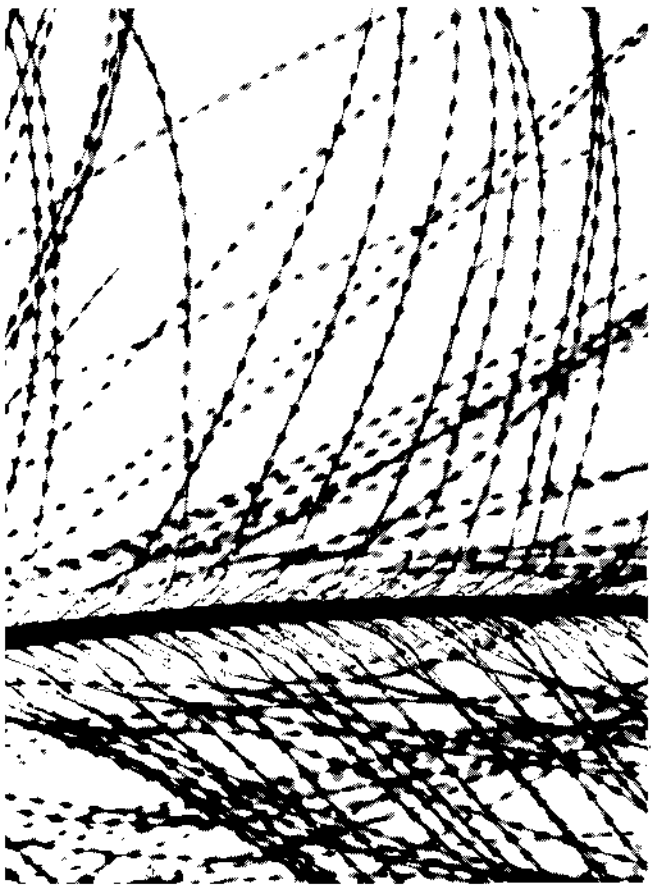


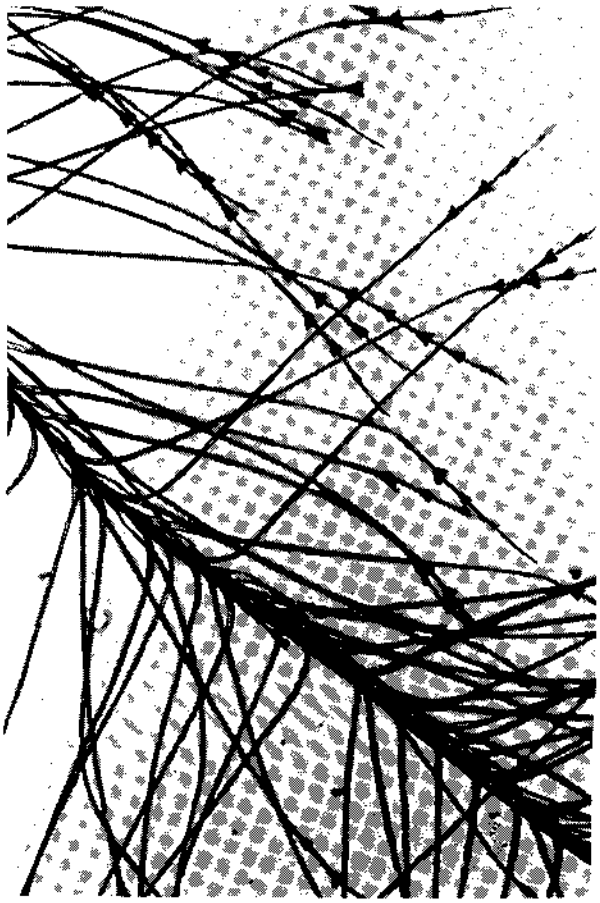
Figure 7

Barbules with prongs; Gannet Sula bassana (165x)



Subdivision into pigmentated nodes and internodes; Lesser Spotted Woodpecker Dendrocopus minor (130x)

Villum at the base of a barbule; Hooded Crow Corvus corone cornix (510x)

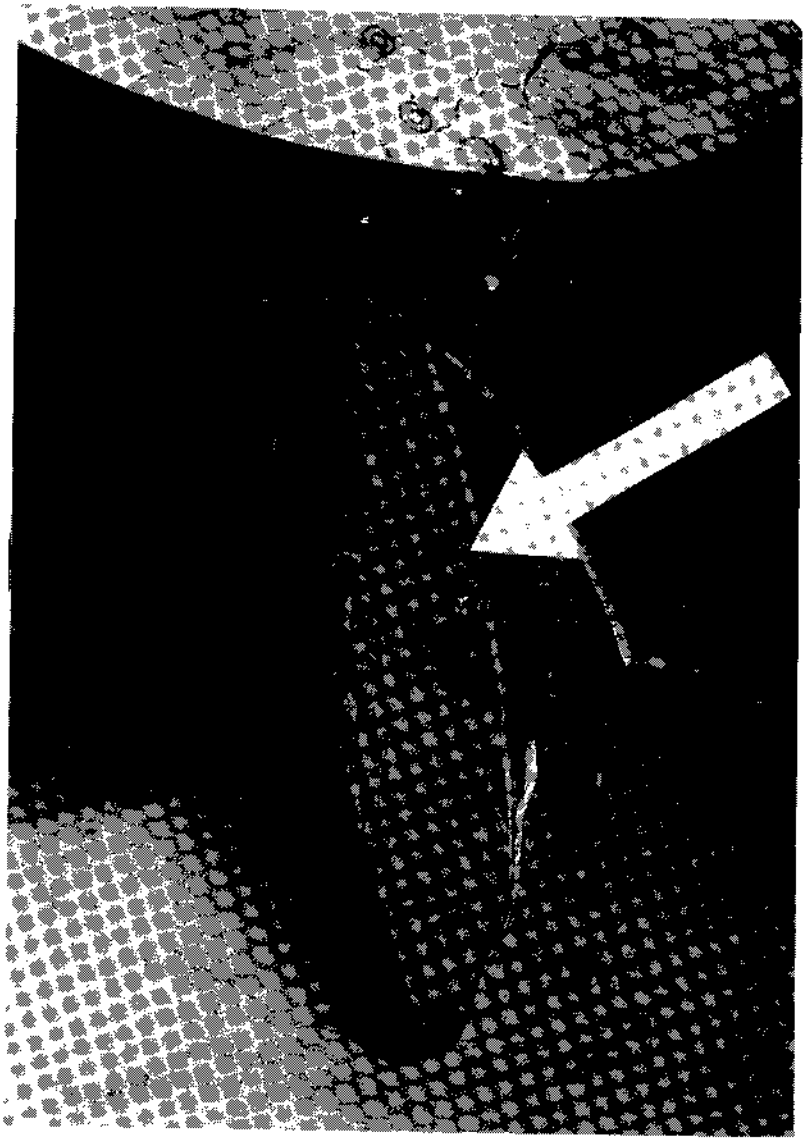


Heart-shaped nodes at the distal part of the barbules; Goldeneye Bucephala clangula (165x)

On the basis of these and similar characteristics, an identification-key has been made (which shall be published before long). with the help of this key (combined with the old macroscopic method), 150 recent bird-collisins have been analysed . The result is a large decrease in unidentified feather-remains (table 2).

Table 2. Identification-results 1975-79 (microscopic and macroscopic)

	number	percentace
species	63	43%
probable species	-	-
family	42	28%
probable family	-	-
order	41	28%
unknown	2	1%



Microscopic examination of scraped feathers (combined with the macroscopic method) showed that in this collision a Golden Plover (Pluvialis apricaria) was involved.