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PROPOSAL FOR THE ESTABLISHMENT OF A EUROPEAN CENTRE FOR THE IDENTIFICATION OF BIRD REMAINS

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ABSTRACT

Proper identification of bird remains is essential and fundamental to bird strike statistics. During the last meetings of BSCE a growing interest in the methods of identification was noticable, resulting in the establishment of the Working Group "Bird Remains Identification". The next step forward and one of the major goals of the newly formed Working Group should be the standardization of identification methods employed in different countries. One of the possible ways is to concentrate existing expertise and subsequently make it available to all organizations that have identification problems. In this paper it is therefore suggested to establish a European Centre for the Identification of Bird Remains.

INTRODUCTION

Bird Strike problems are international in scope. Airplanes and birds both cross national boundaries in their wanderings. The very reason for the existence of the Bird Strike Committee Europe is the wish to tackle the problem by international cooperation of airports, airliners, air forces, and pilot organizations with engineers and biologists in order to reduce the number of collisions between birds and aircraft as much as possible.

In many countries bird strike reporting systems are in operation in order to get an insight into the bird hazard. However, standards of reporting vary considerably among different countries and hence the accuracy and reliability of bird strike statistics may differ between countries, airline companies, and national air forces. If bird strike statistics are ever to be standardized internationally, it is evident that much work has to be done, firstly by improving standards of identification and next also in the field of education and motivation of pilots, airfield personnel and engineers. To obtain the best possible insight in bird hazard, all strikes should be reported as fully and accurately as possible, and even the smallest bird remains should be collected. From their side, biologists have to promote the expertise available in the bird remains identification services. On several occasions the possibilities of feather identification have been illustrated (Brom & Buurma 1979, Laybourne 1984, Brom 1988).

IDENTIFICATION AT THE ZOOLOGICAL MUSEUM AMSTERDAM

In 1960, the department of ornithology at the Zoological Museum Amsterdam became involved in bird strike research when Prof. Dr K.H. Voous agreed to identify feathers for the RNLAF. Since then, a bird strike reporting scheme has been in operation. All bird remains received have been permanently stored at the museum. This collection amounts to more than 2100 samples (Fig. 1). At first, identifications were made by comparison with bird skins in the collection (Figs. 2 & 3). In the Seventies, it became apparent that a much higher proportion of the remains could be identified by microscopical and submicroscopical techniques. These are now applied routinely, not only to bird strikes that cause damage, but also to very small amounts of material (Fig. 4), e.g. found during engine checks. By quickly reporting the results, those finding such remains are induced to report as best they can. Consequently, the RNLAF now disposes of statistical data that are as unbiased as possible. The effect that accurate identification methods have on bird strike statistics has been demonstrated unambiguously (Buurma & Brom 1979, Brom 1984, 1988, Buurma et al. 1984).

PROBLEMS WITH REPORTING

Several factors may account for defective reporting of bird strikes and hence for unreliable or biased statistics (e.g., Blokpoel 1976, Buurma & Brom 1979, Thomas 1988):

1) Bird strike reports originate from different sources, mostly from pilots, groundstaff, or engineers, and the quality therefore depends on the dedication and ornithological knowledge of these people. This can to some extent be mended by the obligatory use of standard reporting forms compelling reporters to pay attention to the relevant details.

2) The importance of collecting bird remains may not be equally or fully understood by everyone who is in the position to retain these remains for identification. Furthermore, some organizations are only interested in the exact identification of the species involved in case the bird strike has caused damage to the aircraft, while others as a routine collect all remains that can be detected. A reliable report to those responsible, produced quickly after the event, may increase collecting effort and keep it high.

3) From the questionaire which has been circulating during BSCE 19 in Madrid it can be concluded that the identification standards differ enormously among countries. In some countries the birds involved are identified by airfield personnel only, in others identification services are available where professional biologists analyse bird remains. The use of light- and scanning electron microscopy (LM & SEM) makes sure that small remains are as seriously treated as easily recognizable ones.

The main conclusion of more than a decade of study of RNLAF bird remains is that if identification is performed without thorough examination of the remains by professional biologists, bird strike statistics are seriously biased by an over-representation of easily recognizable bird species.

If bird strike reporting is to be standardized internationally, it is evident that much work has to be done, especially in the field of information and motivation of pilots, airfield personnel and engineers. To obtain the best possible insight in bird hazard, all strikes should be reported as fully and accurately as possible, and even the smallest bird remains should be collected. From their side, biologists will have to make available their expertise in well-organized and smoothly running identification services.

Several techniques are available for the analysis of bird remains (see review in Brom 1988), but for routine purposes the most effective method at present is the study of the microstructure of feathers by light- and scanning electron microscopy (Figs. 5 & 6) in combination with the use of a reference collection of bird skins (Figs. 2 & 3). Especially in the structure of downy barbules many diagnostic characters are found (Chandler 1916, Laybourne 1984, Brom 1986). By this method, bird strikes can always be confirmed by the presence of feather remains in the samples. In 4% (n=1659) only identification as "bird" is possible, but in all other cases the remains can be assigned to order level (e.g. "Passeriformes - songbirds"), from which 71% are identified to family (e.g. "Laridae - gulls"), 64% to genus (e.g. "Columba- pigeons") and 58% to species (e.g. "Apus apus - Swift"). In a number of cases, an indication of the weight of the bird can be obtained, even if exact identification to species is not possible (Brom 1986). This is important since weight is a key factor in the analysis of bird strikes.

IDENTIFICATION AND THE ROLE OF BSCE

During BSCE 19 in Madrid the participants of the sub-group on feather identification agreed on two major conclusions:

1) Proper identification of bird remains is essential and fundamental to bird strike statistics;

2) Within BSCE is a growing interest in the methods of identification and a need to establish contacts between people working in this field.

These conclusions have resulted in the foundation of BSCE's Working Group "Bird Remains Identification", which can be considered as a recognition of the role identification should play in the analysis of the bird strike problem. Proper identification of bird strike remains is indispensible as a diagnostic tool. Only when it is well known which species cause the worst problems, intelligent measures can be taken towards the solution of these problems.

So, the next step forward and one of the major goals of the newly formed Working Group should be the standardization of identification methods employed in the different countries. In order to achieve this and to improve existing methods, the following strategy can be followed.

In those countries where already exists a national centre for identification, this continues to operate, but in a standardized way. In cases where sophisticated techniques are needed to solve the problem or where an independent outside expert opinion is needed, a European Centre could step in. Such a European Centre would to a certain extent constitute a second-line facility. Countries where no central identification of bird remains takes place at present should either establish their own national centre or else directly go

to the European Centre. In this way the European Centre could be a first-line facility, such as the Zoological Museum Amsterdam has been for the RNLAF for three decades. The identification problems in Europe and neighbouring countries are so similar that a joint service can effectively deal with difficult cases. This is effective because sophisticated techniques have to be developed only once, because new developments can be incorporated quickly, and because continuity of expertise can be guaranteed. In the next sections a proposal for establishing a centre for the identification of bird remains is presented.

AVAILABLE EXPERTISE

At the Zoological Museum Amsterdam (Institute of Taxonomic Zoology) the feather structure of many birds of different taxonomic groups has been studied in detail. Currently, this research programme is partly funded by the Netherlands Science Council NWO, because the programme focuses on the implications these findings have for the reconstruction of avian phylogeny (Brom 1987). Briefly, many groups of birds are easily recognized, such as ducks, parrots, pigeons, or kingfishers, but we have little idea how these groups are evolutionary related. Recently, for example, the phylogenetic relevance of characters such as "flexules" or "villi" for avian taxonomy has been studied (Brom & Visser 1989, Brom 1990).

It is evident that also the practical side, the analysis of bird strikes, greatly benefits from these studies since new diagnostic characters become available. If both types of research are combined they will support and reinforce each other. The presence of a large bird skin collection, LM and SEM facilities and an extensive library with literature on feather research further contribute to the optimal conditions needed for proper identification. Currently, our literature database on feather research comprises more than 800 references. Moreover, the museum is part of a university faculty, which facilitates access to sophisticated laboratory techniques. It is therefore suggested to establish an identification centre at the Zoological Museum Amsterdam.

CONDITIONS FOR AN IDENTIFICATION CENTRE

If the foundation of a European Centre for Identification of Bird Remains is considered desirable, this centre has to meet some requirements. Three main groups of conditions can be distinguished.

1) A European Centre should have a surplus value. A surplus value is manifest in:
- Standardization of procedures, identifications and reporting.
- A guaranteed quality for a reasonable price.
- An assured continuity of expertise.
- An adequate infrastructure (presence of reference collections: bird skins, photographs, slides, literature etc.) within a research institute.

2) A European Centre should provide reliable service. The Centre should inspire confidence by:
- Independent expertise of high standard.
- Fast identifications with detailed reports.

3) Agreements should be concluded between the Centre and those making use of its services.

Of course, it will always be possible to have bird remains identified at the centre at a specified price per identification, depending on the amount of work invested. However, both the continuity and the possibilities for developing new and better identification techniques will be more firmly based if aviation authorities in various countries should decide to make an agreement with the identification centre. Such an agreement would entitle them to the right of having the problematical identifications carried out at the centre or, alternatively, to a full first-line service.

Agreements should by preference be based on contracts, with attention to a proper financial calculation (which should be negotiated by the client and the Faculty of Biology at the Amsterdam University). In the long run, a European Centre would have difficulties to survive if it only depended on ad hoc identification of bird remains. This would be a rather weak basis for a professional organization, considering the above mentioned requirements. So the centre needs the support of BSCE members to guarantee that it eventually will become fully fledged.

ORGANIZATION

The Faculty of Biology at the Amsterdam University is willing to establish an identification centre for bird remains at the Zoological Museum. The faculty will place the centre under the responsibility of the museum director, as an organizationally recognizable unit on its premises. Contracting clients might in future prefer a different legal construction, e.g. making a Foundation (under Dutch law) with the contracting aviation authorities being represented on the board. This foundation could then conclude a housing agreement with the faculty.

Bird remains collected after bird strikes which are to be identified at the centre should be sent as complete as possible. The identification result can be reported by mail within a fortnight, but, if urgently desired, on the day of receipt by telephone or fax. The material (both remains and microscopic preparations) will be stored for further reference in the collections of the Zoological Museum.

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Figure

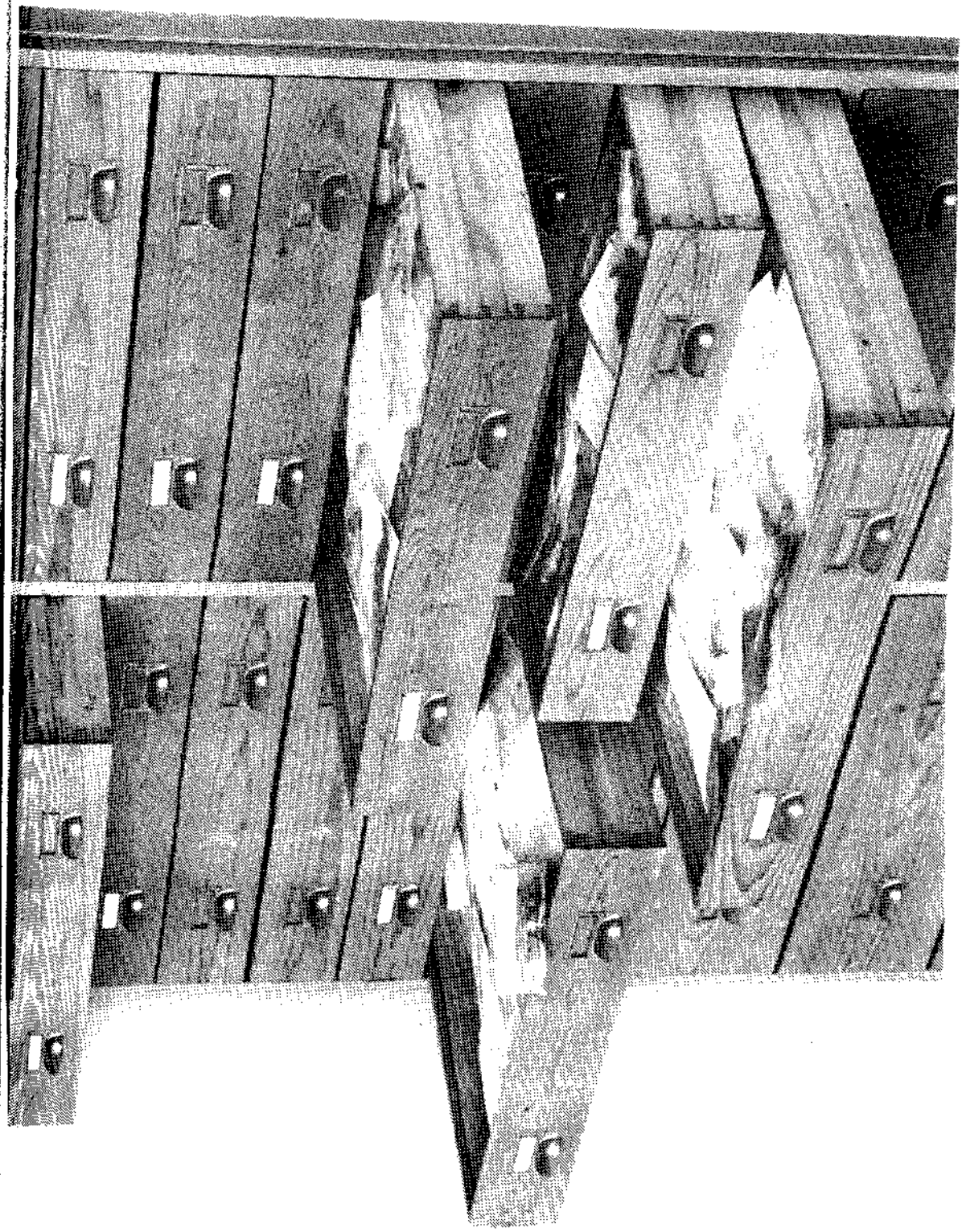

Figure 1. Collection of RNLAF bird remains 1960-1990.

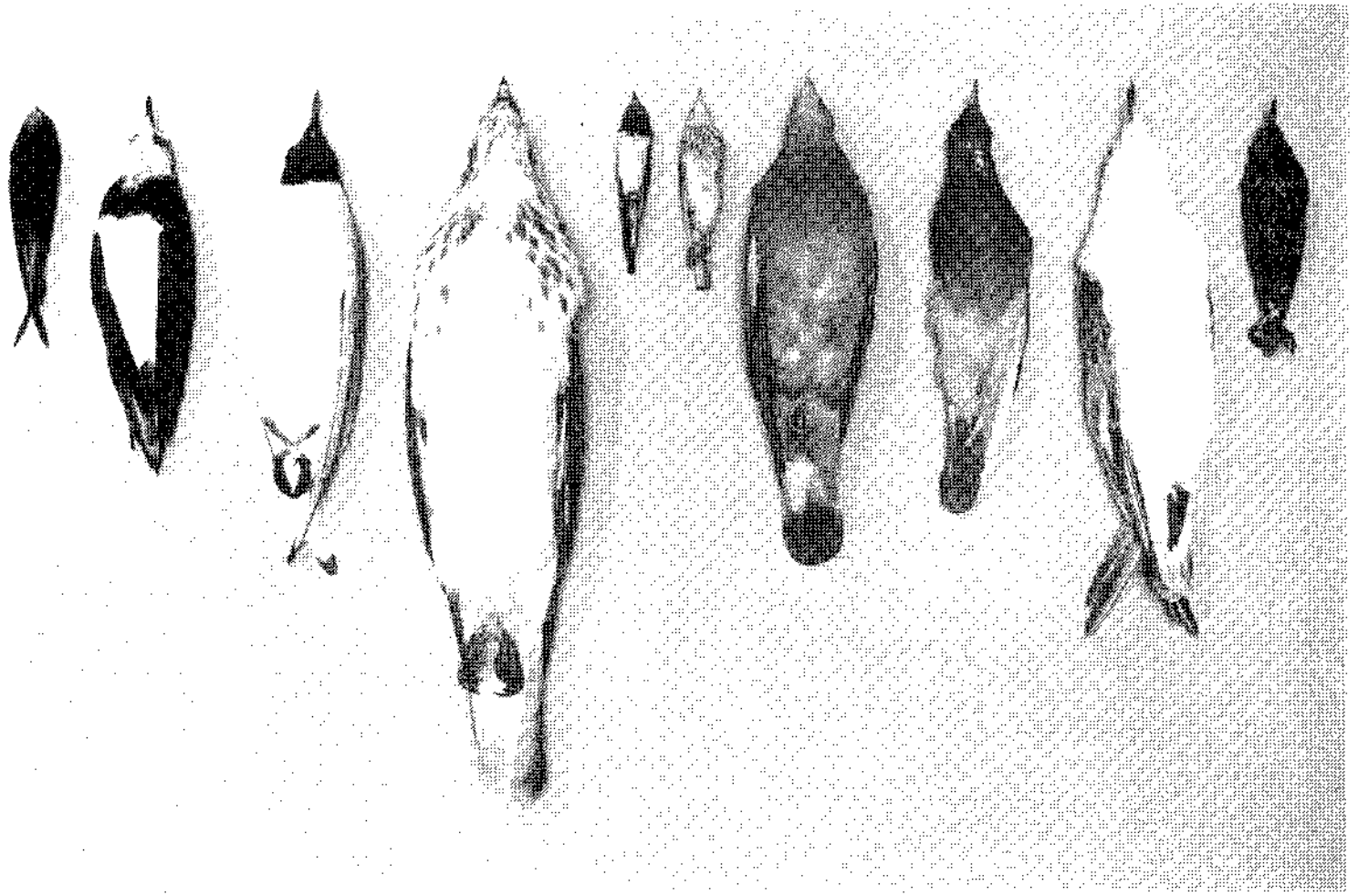

Figure 2. Bird skins in the ZMA collection, from left to right the species most frequently involved in RNLAF bird strikes: Swift, Lapwing, Black-headed Gull, Buzzard, Swallow, Skylark, Wood Pigeon, Feral Pigeon, Common Gull and Starling.

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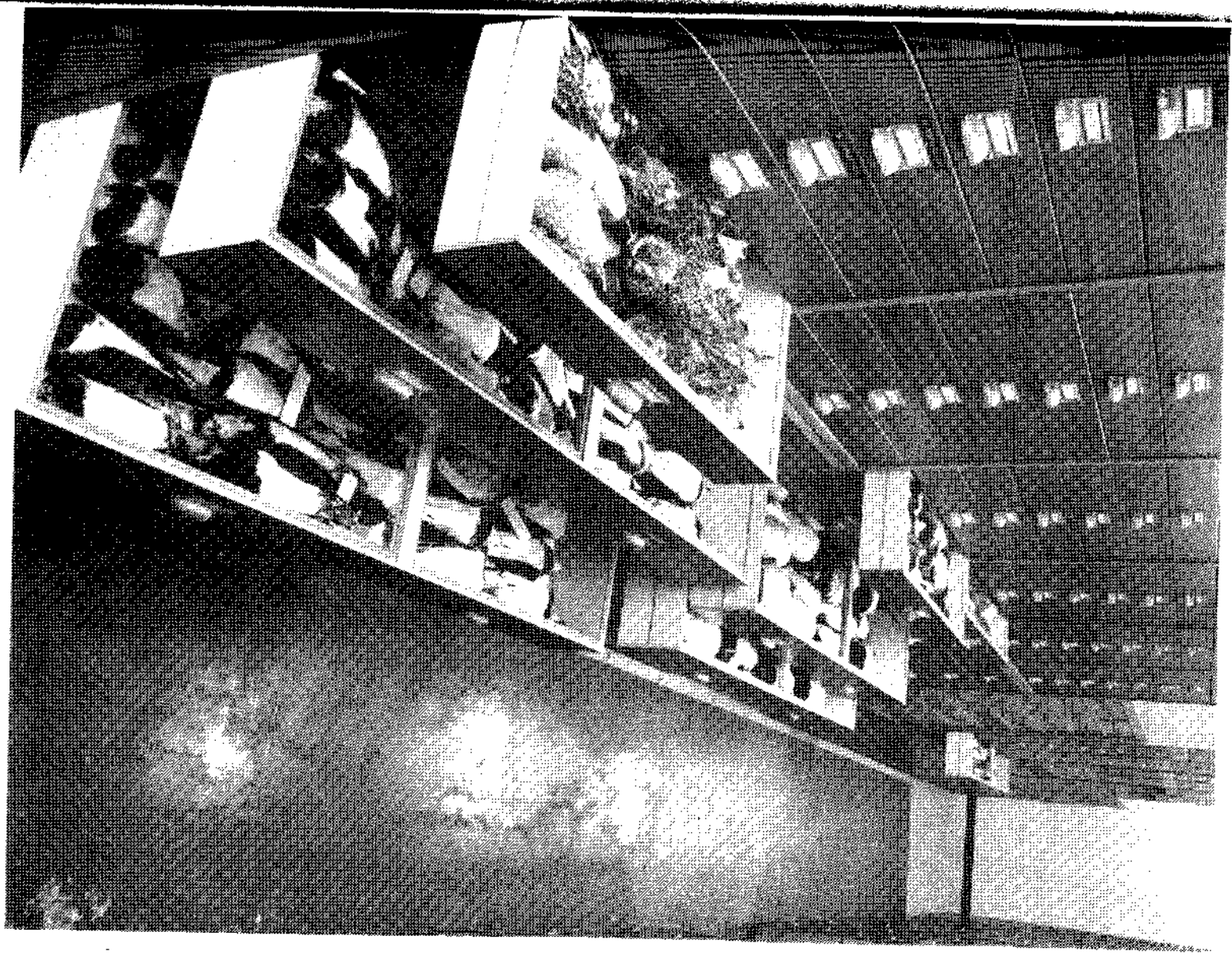

Figure 3. Bird skins in the ZMA collection.

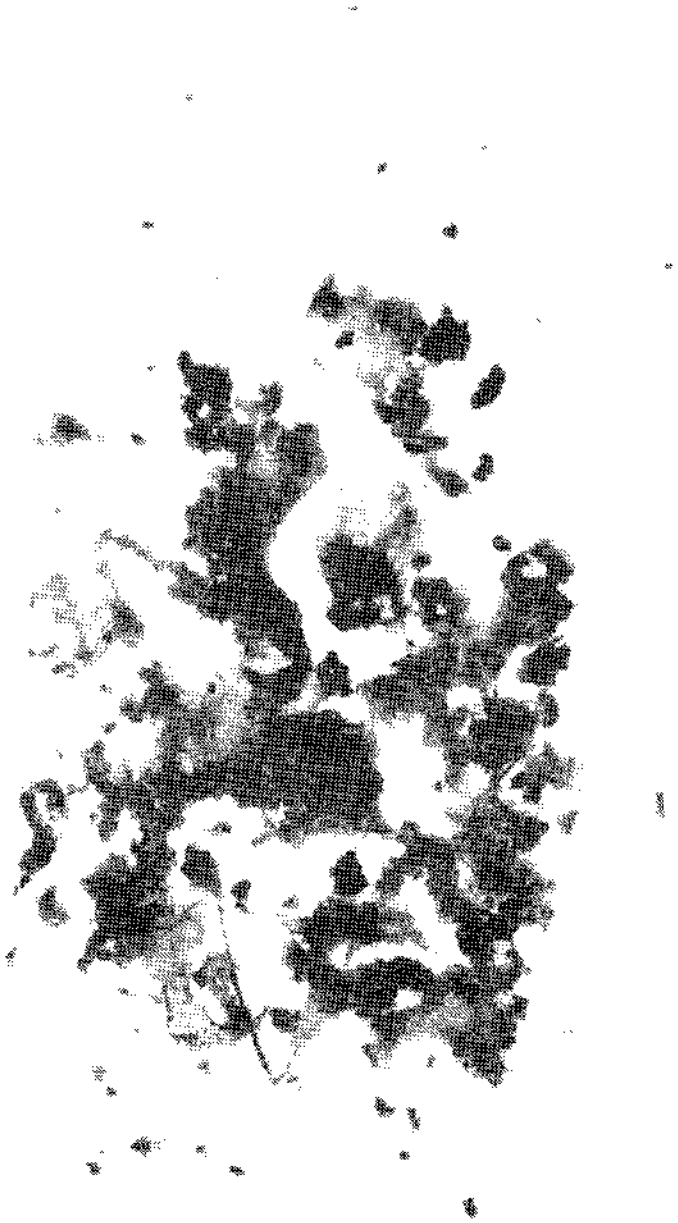

Figure 4. Small bird remains, in this case from Swift.

Figure 5. Analysis of bird remains by light microscopy.

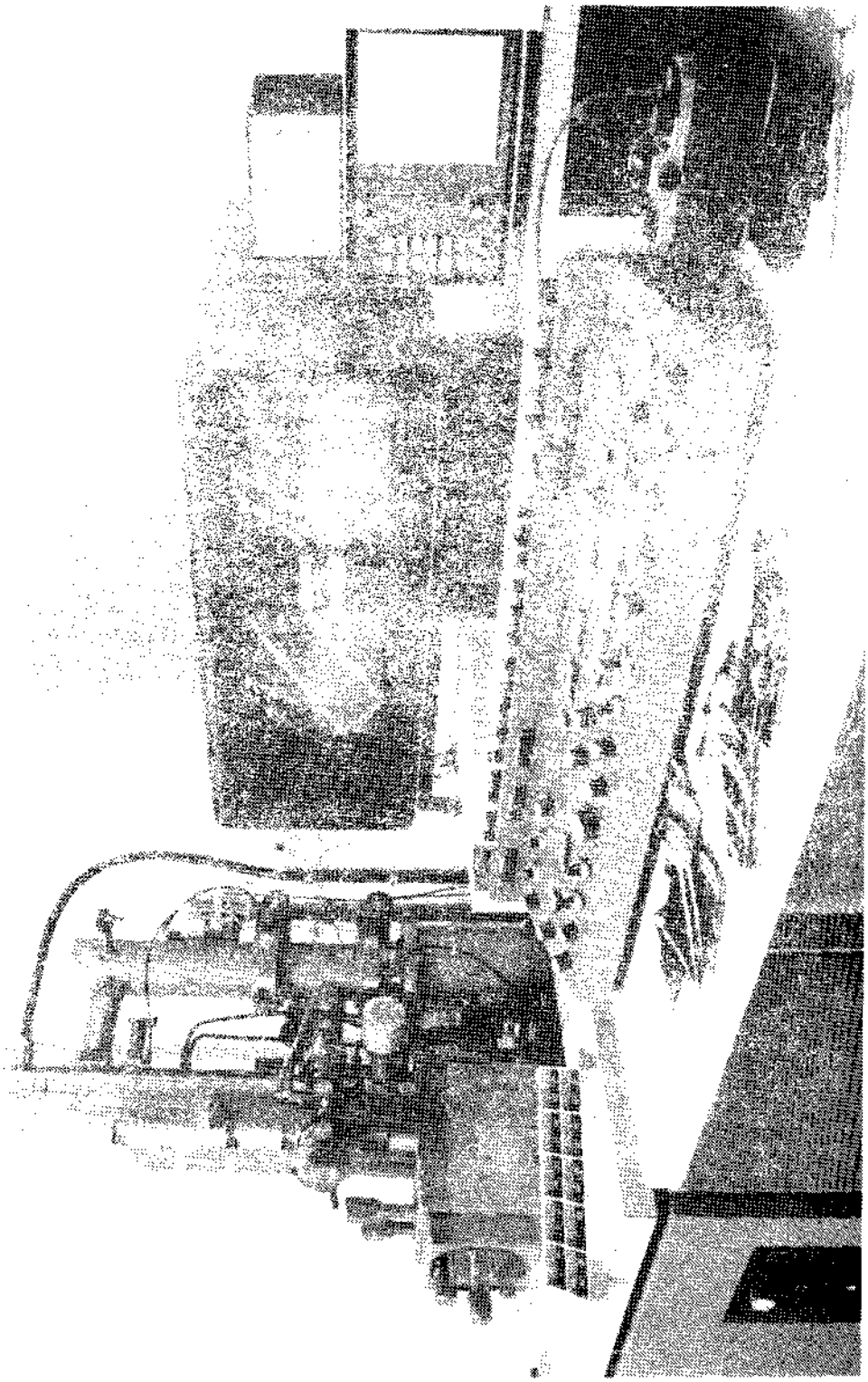

Figure 6. Analysis of bird remains by scanning electron microscopy

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