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THE VALUE OF BILL LENGTHS OF MUSEUM SPECIMENS IN BIOMETRIC STUDIES

by Ron Summers

The measurement of bill, wing, or any other structure is a useful technique in the study of migration (Evans 1964). However, the technique is fraught with problems which make standardisation difficult. One of the difficulties is in the use of museum material. Standard bird text books give biometric data based on museum specimens but the application of these measurements to the field situation is problematical; e.g. it has been shown that wings of museum skins shrink (Vepsäläinen 1968; Green & Williams 1973). Bill length however, is believed to be the least variable of the biometric measurements though the possibility that the bills of museum skins shrink has not been investigated.

I had the opportunity to measure a series of freshly collected birds and to compare them with skins from various South African museums (Cape Town, Pretoria, Durban, East London). Being at the tip of Africa it is likely that the birds of a given species are drawn from the same origin and that one does not experience such a complex situation as seen in Europe. One would therefore expect the mean bill lengths of the freshly collected birds and museum specimens to be the same. However, the table shows that in the two species investigated, Turnstone Arenaria interpres and Sanderling Caliadris alba, the museum birds tend to have lower bill lengths. In the Turnstone the difference amounts to 5.4% (males) and 4.4% (females) whilst in the Sanderling it is 1.6% (males) and 2.7% (females). These differences were highly significant in the Turnstone, but not in the Sanderling where the sample size is smaller (Table.). The explanation for the difference between the two species may lie partly in the structure of the bill, for in the Turnstone the rhamphotheca (the horny sheath) extends further beyond the bone point of the bill. The Sanderling on the other hand has a rounder tip to the bone around which the rhamphotheca fits more closely (Figure). Shrinkage of the rhamphotheca will therefore be limited by the bone.

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In conclusion, it appears that in the study of the biometrics of the Sanderling, and presumably other sandpipers, the problem of bill shrinkage in museum material will not be important when looking at gross differences but must be borne in mind when dealing with very small differences. However with the Turnstone, and perhaps other species, the bill lengths of museum specimens should not be used directly in biometric studies of live birds.

TABLE. Mean bill lengths of freshly collected and museum skins of Turnstone and Sanderlings from South Africa.

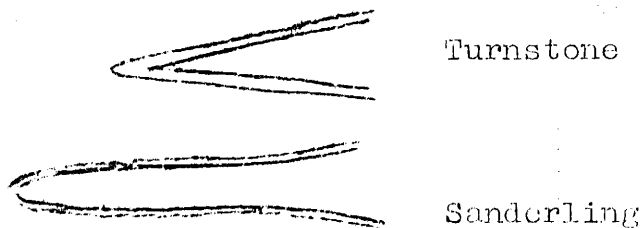
Turnstone

	Fresh			Museum			
	Mean	± SD	N	Mean	± SD	N	
Male	22.1	± 0.8	29	20.9	± 0.9	18	(t = 4.83 p 0.001)
Female	22.6	± 0.8	26	21.6	± 1.0	35	(t = 4.43 p 0.001)

Sanderling

Male	25.0	± 1.1	52	24.6	± 1.4	8	(t = 0.97 p 0.1)
Female	26.2	± 1.1	15	25.5	± 1.2	22	(t = 1.89 p 0.05)

FIGURE. Dorsal views of the bills of Turnstone and Sanderling showing the outlines of the bone and rhamphotheca.



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REQUEST FOR INFORMATION: weights of retrapped Ringed Plover chicks

Information is requested on the growth weights of Ringed Plover chicks from all parts of the British Isles (& elsewhere, if available) in any year. Any data on individual chicks weighed at least twice would be welcome. Please include dates of weighing (and hatching, if known), locality and any other relevant information. Records from single birds would be appreciated, as well as more abundant data.

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SEASONAL CHANGES IN BILL-LENGTHS OF KNOTS, AND A COMMENT ON
BILL MEASURING TECHNIQUES FOR WADERS

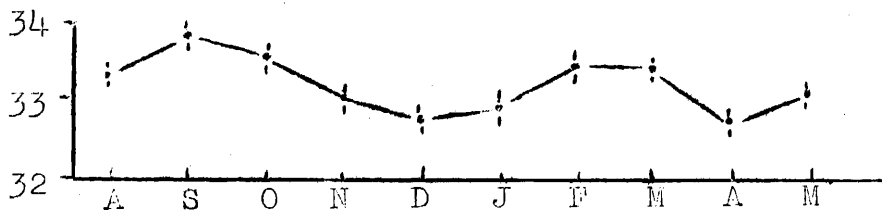
by Mike Pienkowski

The problem

Wing-lengths and bill lengths are the methods at present most used by ringers in order to attempt to separate wader populations. The difficulties in standardising wing measurements between different observers are notorious, and, even when this is overcome, there may be problems concerned with seasonal changes of wing-length in individual birds (Pienkowski & Minton 1973). The measurement of bill-lengths is possibly easier to standardise between observers, but little attention has been given to the possibility of seasonal changes in these, although White and Gittins (1964) subjectively considered seasonal changes in the bill shapes of Oystercatchers Haematopus ostralegus.

While attempting to separate Palaearctic and Nearctic Knot Calidris canutus populations on the basis of bill-lengths (to be published elsewhere), William Dick and I found that, in most areas, the mean bill-lengths of the Knots caught varied cyclically (Fig 1).

Fig 1 Monthly mean (± one standard error) bill lengths of adult Knots at the Wash.



It was clearly important to discover if the variations were due to changes in the racial composition of the flocks or to changes in bill-lengths of individuals. Fortunately, a large number of retraps within the same year had been accumulated by the Wash Wader Ringing Group and these data show that the seasonal changes in the population means were due to variations in the bill-lengths of individuals during the year. (Elsewhere, Dick, Pienkowski, Waltner & Minton, in prep.), We have shown that the seasonal changes shown by retrap data are statistically significant.

We can suggest two possible explanations for a seasonal change in measured bill-length of an individual bird:

- a) seasonal changes at the feather-margin at the base of the upper mandible associated with abrasion and moult; or
- b) seasonal changes in the growth or wear (or, perhaps, the degree of compression) of the rhamphotheca, perhaps related to feeding conditions.

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