How to Distinguish First-Year Murres, *Uria* spp., from Older Birds in Winter

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Gaston, A. J. 1984. How to distinguish first-year murres, *Uria* spp., from older birds in winter. Canadian Field-Naturalist 98(1): 52–55.

I examined breeding season and winter specimens of Common and Thick-billed Murres to find a method for distinguishing first-year from older birds. The presence of well-developed supra-orbital ridges appears to be characteristic of older birds, which in the case of Thick-billed Murres also have larger bill dimensions. A method for aging Thick-billed Murres on the basis of bill measurements is given.

Key Words: Murres, *Uria lomvia, Uria aalge,* age determination, skull.

Fledgling Common Murres, *Uria aalge*, and Thick-billed Murres, *Uria lomvia*, leave their breeding colonies at only 20-25 % of adult weight (Tuck 1961; Gaston and Nettleship 1981). Little is known about their growth in the period following their departure, but by the time they arrive on their wintering grounds 3-4 months later they have reached more-or-less adult size. Differences in wing, bill and tarsus measurements between adult and first-year Thick-billed Murres were noted by Storer (1952), but the measurements he presented do not allow individual birds to be aged precisely because of a wide area of overlap. Also, Storer indicated that he distinguished first-year murres on the basis of their measurements; a somewhat circular procedure.

While examining a series of murres shot in Newfoundland in winter, I noticed variation among specimens in the extent to which the supra-orbital ridges of the skull were developed. This appeared a likely character for aging the specimens, and I therefore tried to compare the variation in the development of the supra-orbital ridge to other age-related phenomena.

I examined the following samples of Thick-billed Murres:

(1) 19 collected near Twillingate, NE Newfoundland, in November 1981;
(2) 52 from Trinity Bay, SE Newfoundland, collected in February 1981 (20) and February 1983 (32);
(3) Three, including a banded bird known to be in its first winter, collected in February 1982 in Placentia Bay, Newfoundland;
(4) Additional heads without bodies from Trinity Bay in February 1981 (18) and December 1982 (32) and from Twillingate in November 1981 (6);
(5) 40 collected near a breeding colony at Digges Island, N.W.T., in summer, of which all but four had large brood-patches indicating that they were breeding.

The supra-orbital ridges on all of the birds from Digges Island were well developed, thickened at the outer margin and each pierced by two prominent fossae (Figure 1A). All breeders were probably at least four years old (by analogy with Common Murres; Birkhead and Hudson 1977). By contrast, 27 out of 111 Thick-billed Murres examined from Newfoundland, including one known first-year bird, showed no development of the supra-orbital ridges (Figure 1B). Comparison of measurements showed that the birds without supra-orbital ridges were significantly smaller than those with supra-orbital ridges in all measurements (Table 1).

I examined this phenomenon also in Common Murres by taking x-ray photographs of two 13-year-old and two first-year (live) birds from the Montreal Aquarium. I also dissected one dead first-year Common Murre supplied by the aquarium. All three first-year birds showed incomplete ossification of the supra-orbital ridges, whereas the two adults had prominent ridges. Ten adult Common Murres from Newfoundland breeding colonies in the National Museums of Canada collection all had prominent supra-orbital ridges.

Only two of the Thick-billed Murres examined by dissection were clearly intermediate between the two types illustrated in Figure 1. The scarcity of intermediates among either summer or winter samples suggests that developement of the supra-orbital ridges proceeds quite rapidly, most of it presumably taking place between the end of the first winter and the start of the second. Hence birds without any development of supra-orbital ridges can probably be treated as first-years. In the Razorbill (*Alca torda*), where first-winter birds can be identified by a lack of grooves on the bill, no first-winter birds had supra-orbital ridges, but the majority of older birds did in a sample of 107 (P. Hope-Jones *in litt.*).

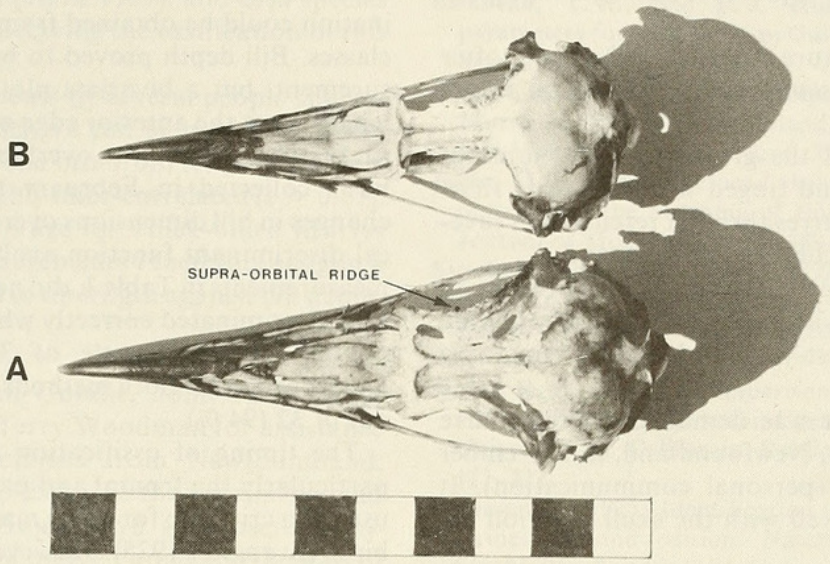

FIGURE 1. Skulls of Thick-billed Murres collected in Trinity Bay, Newfoundland, in February 1981; (A) adult type, (B) first-year type.

TABLE 1. Differences between "first-year" and "older" Thick-billed Murres collected in February and November (for aging criterion, see text).

Measurement		First Year			Adult			t	P
		$\bar{x}$	SD	N	$\bar{x}$	SD	N		
Weight (g)	NOV	915.6	106.3	15	1000.2	77.0	4	1.79	NS
	FEB	817.5	49.3	8	951.9	69.8	45	5.20	< 0.001
Wing (mm)	NOV	206.5	7.7	15	218.5	3.7	4	2.98	0.008
	FEB	205.5	5.6	8	216.2	5.5	45	5.03	< 0.001
Bill:									
line[1] (mm)	NOV	52.3	3.2	14	57.4	2.0	4	2.99	0.009
	FEB	50.6	1.4	7	54.2	2.0	44	4.88	< 0.001
depth[1] (mm)	NOV	11.0	0.6	14	13.2	0.9	4	6.13	0.001
	FEB	11.1	0.8	9	13.0	0.5	43	8.80	< 0.001
culmen (mm)	NOV	31.0	3.2	14	34.8	2.5	4	2.16	< 0.047
	FEB	31.4	3.1	10	34.1	1.9	44	3.60	< 0.001
nostril[1] (mm)	NOV	25.0	1.7	14	28.0	2.1	4	2.99	0.009
	FEB	25.7	2.6	10	28.6	1.1	44	5.66	< 0.001

[1]Measured as follows: distance from proximal end of white line above gape to bill tip (line);
depth just proximal to notch in lower mandible;
distance from distal edge of external nares to bill tip (nostril).

Other criteria which seem closely related to the presence or absence of supra-orbital ridges in murres are:

(1) the colour and texture of the feet, which are softer and paler in birds without supra-orbital ridges than in others;
(2) the appearance of the greater coverts, some of which are worn and tinged with brown in first-year Common Murres through retention of juvenile feathers (Kuschert et al. 1981); and
(3) in Thick-billed Murres the flexibility of the lower mandible, which will bend if the body is held only by the beak in first-year birds, while remaining rigid in adults.

The third character was demonstrated by murre hunters at Twillingate, Newfoundland, in November (R. I. Goudie, CWS, personal communication). It appears to correlate well with the skull criterion for November birds.

Assuming that birds with supra-orbital ridges in winter are more than one year old and those without are first-winter birds, I examined the bill measurements of birds collected in winter to see what discrimination could be obtained from them for the two age classes. Bill depth proved to be the best single measurement, but a bivariate plot of bill depth against length from the anterior edge of the nostril to the bill tip further reduced the overlap (Figure 2, using only birds collected in February to allow for possible changes in bill dimensions over the winter). A canonical discriminant function analysis, incorporating all measurements in Table 1, did not improve the proportion discriminated correctly when both methods were applied to the sample of 32 birds collected in December 1982. Both methods correctly identified 30 out of 32 (94 %).

The timing of ossification of parts of the skull, particularly the frontal and parietal bones, has been used as a criterion for aging many species of passerine birds (Svensson 1975). However, the development of supra-orbital ridges has not been used previously as a criterion for age so far as I can discover. This area is

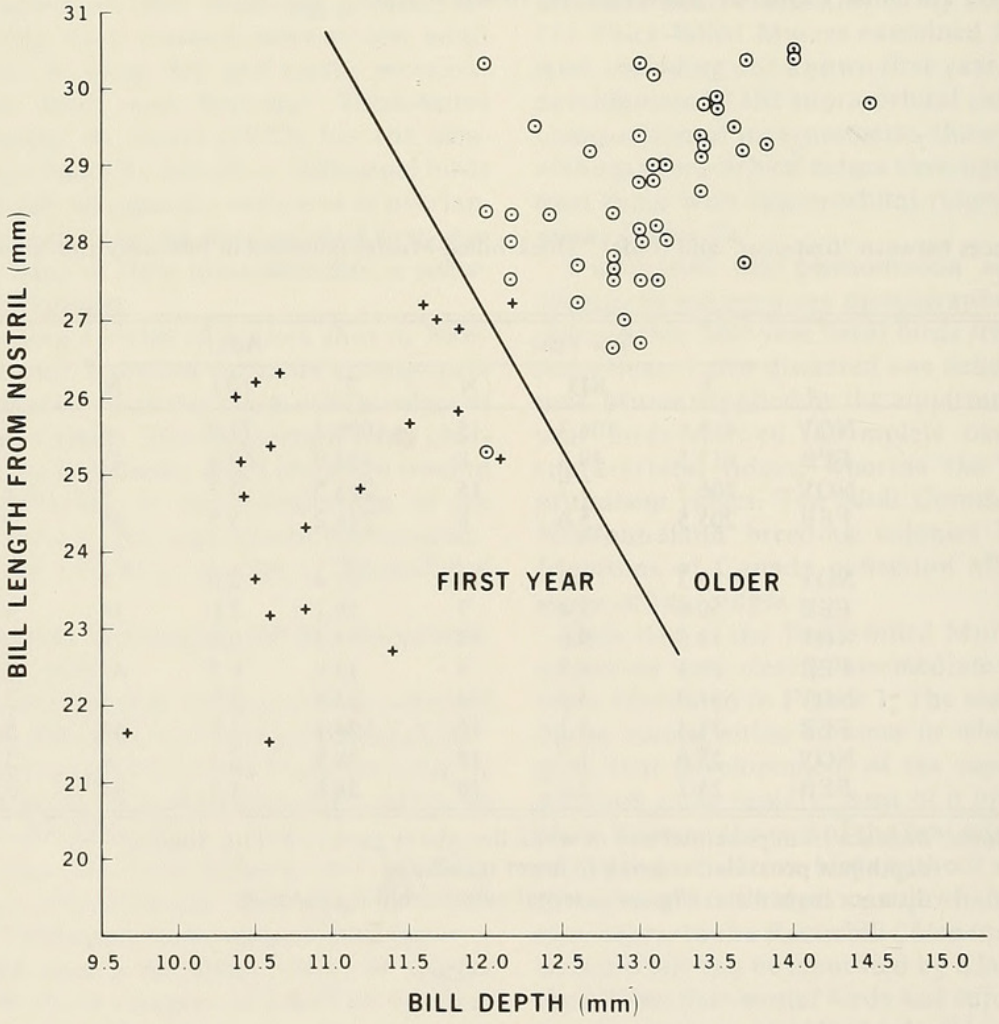

FIGURE 2. Scatter plot of bill depth against nostril length for Thick-billed Murres collected in Newfoundland in February.

complete soon after hatching in the case of the domestic fowl (*Gallus gallus*) (Jollie 1957), and *Uria* species seem to be unusual in delaying the ossification of this region.

Replicate measurements by several people suggest that the nostril to tip length can be more accurately measured than any of the other bill length measurements, which are all highly inter-correlated ($r > 0.67$). For a practical guide to age for Thick-billed Murres based on external measurements I therefore suggest a bivariate plot of nostril to tip length against bill depth.

Acknowledgments

Many thanks to Ian Goudie, John Piatt, Steve Wendt and Todd and Terry Woodman for assistance in obtaining the specimens from Newfoundland. David Noble helped to examine the specimens, and Graham Cooch and Hugh Boyd gave useful comments on the manuscript. Serge Parent and the staff of the Montreal Aquarium were very helpful in arranging for me to examine their captive birds and Dr. Jean-Luc Bureau took the X-ray photographs. Peter Hope-Jones supplied information on Razorbills. The drawing was provided by the Drafting Unit of Environment Canada.

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Received 22 April 1983
Accepted 15 October 1983

Unusual Damage Caused by Muskrats, *Ondatra zibethicus*

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Craven, Scott R. 1984. Unusual damage caused by Muskrats, *Ondatra zibethicus*. Canadian Field-Naturalist 98(1): 55–56.

Two cases of damage to wiring hoses, cables and tubing of a vehicle and of propane exploders (for Canada Goose dispersion) due to Muskrats are reported.

Key Words: Muskrats, *Ondatra zibethicus*, gnawing damage.

Rodents damage a wide range of inert or inedible materials. While this damage is widely recognized, the behavioral motivation has not been well established. The Norway Rat (*Rattus norvegicus*) and the Pocket Gopher (*Geomys bursarius*) frequently gnaw on hard objects, presumably to sharpen and maintain their continuously growing incisors (Howard 1953). The Porcupine (*Erethizon dorsatum*) gnaws on any object covered with a salty solution such as human perspiration or encrusted road salt (Jackson 1961). Porcupine behavior, and the rapid consumption of shed antlers by small mammals, suggests that these species are satisfying a need for certain minerals. Welker and King (1962) demonstrated the influence of novelty of both edible and inedible materials in the eating and gnawing behavior of laboratory rats. They suggest that rats keep in constant oral contact with a variety of stimuli in their environment, regardless of nutritive value. Thus there are at least three theories to explain rodent damage to inedible materials.

The Muskrat (*Ondatra zibethicus*) is a valuable furbearer but it also does considerable damage in some areas of its range. Errington (1938) described Muskrat damage to corn and other crops in Iowa. Several authors (Lynch et al. 1947; Beshears and Haugen 1953; Cook 1957; Erickson 1966; and Miller 1974) discussed damage resulting from the burrowing activity of Muskrats. In 1969, Miller estimated damage in the rice growing areas of Arkansas to approach $1 million annually. Miller (personal communication)