

This investigation was supported by a grant from the National Science Foundation (DEB 7909806).

LITERATURE CITED

- BAKER, D. H., K. R. ROBBINS, & J. S. BUCK. 1979. Modification of the level of histidine and sodium bicarbonate in the Illinois crystalline amino acid diet. *Poultry Sci.* 58: 749-750.
- CHILGREN, J. D. 1975. Dynamics and bioenergetics of postnuptial molt in captive White-crowned Sparrows (*Zonotrichia leucophrys gambelii*). Unpublished Ph.D. dissertation, Pullman, Washington, Washington State Univ.
- FISHER, H. 1972. The nutrition of birds. Pp. 431-469 in *Avian biology*, vol. 2 (D. S. Farner and J. R. King, Eds.). New York, Academic Press.
- FOGDEN, M. P. L., & P. M. FOGDEN. 1979. The role of fat and protein reserves in the annual cycle of the Grey-backed Camaroptera in Uganda (Aves: Sylviidae). *J. Zool., Lond.* 189: 233-258.
- GAVRILOV, V. M., & V. R. DOLNIK. 1974. [Bioenergetics and regulation of the postnuptial and postjuvinal molt in Chaffinches (*Fringilla coelebs coelebs*).] *Tr. Zool. Akad. Nauk. SSSR* 55: 14-61. (In Russian)
- HANSON, H. C. 1962. The dynamics of condition factors in Canada Geese and their relation to seasonal stresses. *Arctic Inst. North Amer. Tech. Paper No.* 12.
- JONES, P. J., & P. WARD. 1976. The level of reserve protein as the proximate factor controlling the timing of breeding and clutch size in the Red-billed Quelea (*Quelea quelea*). *Ibis* 118: 547-574.
- , & ———. 1979. A physiological basis for colony desertion by Red-billed Queleas (*Quelea quelea*). *J. Zool., Lond.* 189: 1-19.
- KING, J. R., S. BARKER, & D. S. FARNER. 1963. A comparison of energy reserves during the autumnal and vernal migratory periods in the White-crowned Sparrow, *Zonotrichia leucophrys gambelii*. *Ecology* 44: 513-521.
- , & D. S. FARNER. 1965. Studies of fat deposition in migratory birds. *Ann. N. Y. Acad. Sci.* 131: 422-440.
- , & E. E. WALES, JR. 1965. Photoperiodic regulation of testicular metamorphosis and fat deposition in three taxa of rosy finches. *Physiol. Zool.* 38: 49-68.
- MORTON, E. S. 1973. On the evolutionary advantages and disadvantages of fruit eating in tropical birds. *Amer. Natur.* 107: 8-22.
- NEWTON, I. 1968. The temperature, weights, and body composition of molting Bullfinches. *Condor* 70: 323-332.
- RAVELING, D. G. 1979. The annual cycle of body composition in Canada Geese with special reference to control of reproduction. *Auk* 97: 234-252.
- RICKLEFS, R. E. 1976. Growth rates of birds in the humid New World tropics. *Ibis* 179: 179-207.
- WARD, P. 1969. The annual cycle of the Yellow-vented Bulbul *Pycnonotus goiavier* in a humid equatorial environment. *J. Zool., Lond.* 157: 25-45.

Received 20 April 1981, accepted 1 September 1981.

First Record of the Great Auk (*Pinguinus impennis*) from Labrador

RICHARD H. JORDAN¹ AND STORRS L. OLSON²

¹ Department of Anthropology, Bryn Mawr College, Bryn Mawr, Pennsylvania 19010 USA and

² National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560 USA

Recent archeological investigations undertaken by Bryn Mawr College and the Smithsonian Institution along the Torngat Mountain coastline of northernmost Labrador have produced the first documented evidence of the extinct Great Auk, *Pinguinus impennis*, from the Labrador Peninsula. Avayalik Island, where the Great Auk remains were recovered, is only 25 km south of the northern tip of the peninsula (60°06'30"N; 64°13'10"W). The bones were excavated from a site denominated Avayalik-1 (Jordan 1980), located on a small and barren outer island that was occupied by Dorset Paleo-Eskimos between 400 and 450 A.D. Frozen midden deposits at this site contain

hunting, butchering, and processing tools, domestic utensils, debris from tool manufacturing, faunal remains, and occasional amulets and ritual objects usually associated with hunting magic (Jordan 1979-80). The Eskimos here depended heavily upon marine mammals and seabirds for food. Of 1,700 mammal bones identified, over 90% are from seals and walrus. About 1,300 specimens of birds are approximately evenly divided among large gulls (Laridae), diving ducks (Anatidae), shearwaters (Procellariidae), and alcids (Alcidae). A few remains of ravens, geese, small gulls, and ptarmigan were also recovered. The degree of maturity and composition of

the faunal remains suggest late winter to summer occupation of the site (Cox and Spiess 1980).

The remains of Great Auk from Avayalik-1 consist solely of a complete right coracoid, a portion of the proximal end of a left coracoid, and a complete left femur. The coracoids are from birds of noticeably different size, so at least two individuals are represented. The rarity of the Great Auk in these deposits indicates the likelihood that the few birds taken were in passage and that the species did not breed in the area.

Not only were Great Auks used for food by Eskimos and Indians, as demonstrated by bones in middens from Greenland to Florida (Greenway 1958, Brodkorb 1967), but in some cultures the bird evidently had ceremonial significance as well. This is best exemplified by a burial in a Maritime Archaic cemetery, Port au Choix-3, in northwestern Newfoundland, dating to 2300–1800 B.C. A single human skeleton found here had over 200 beaks of the Great Auk distributed over its length, the body having apparently been clothed in a garment consisting entirely of Great Auk skins (Tuck 1976). The fact that the bones obtained from Avayalik Island come from deep within the body (coracoids and femur), and thus would not have been included with a skin, practically precludes the specimens having been obtained through trade with contemporaneous cultures to the south.

The only certainly known breeding site of the Great Auk in the Western Atlantic in historic times is Funk Island, Newfoundland. Although the species is known from midden deposits and a skin from western Greenland, there is apparently no conclusive evidence that it ever bred there (Greenway 1958). Todd (1963: 403) considered that it was not unlikely

that the Great Auk "may have strayed to the coast of Labrador," but he showed that there was no satisfactory evidence of such an instance. The specimens from Avayalik Island thus constitute the sole record of *Pinguinus impennis* from Labrador.

We are grateful to Ralph S. Palmer and Douglas Sutton for information and comments on the manuscript.

LITERATURE CITED

- BRODKORB, P. 1967. Catalogue of fossil birds: Part 3 (Ralliformes, Ichthyornithiformes, Charadriiformes). Bull. Florida State Mus., Biol. Sci. 11: 99–220.
- COX, S. L., & A. SPIESS. 1980. Dorset settlement and subsistence in northern Labrador. Arctic 33: 659–669.
- GREENWAY, J. C. 1958. Extinct and vanishing birds of the world. New York, American Committee for International Wild Life Protection.
- JORDAN, R. H. 1979–80. Dorset art from Labrador. Folk 21–22: 397–417.
- . 1980. Preliminary results from archaeological investigations on Avayalik Island, extreme northern Labrador. Arctic 33: 607–627.
- TODD, W. E. C. 1963. Birds of the Labrador Peninsula and adjacent areas. Toronto, Univ. Toronto Press.
- TUCK, J. A. 1976. Ancient peoples of Port au Choix. Newfoundland Social and Economic Studies, 17. St. John's, Institute of Social and Economic Research, Memorial Univ. Newfoundland.

Received 4 May 1981, accepted 18 August 1981.

A Hybrid between the Hooded and Silver Grebes (*Podiceps gallardoi* and *P. occipitalis*)

ROBERT W. STORER

Museum of Zoology, The University of Michigan, Ann Arbor, Michigan 48109 USA

Hybrids between species of grebes are rare. Voous and Payne (1965, Ardea 53: 9) reported extensive hybridization between the Madagascar endemic, *Tachybaptus rufolavatus*, and the Little Grebe, *T. ruficollis*, which is common on the mainland of Africa and probably represents the stock from which *T. rufolavatus* was derived after an earlier invasion. In this instance, the endemic form evidently had not evolved isolating mechanisms that would have prevented hybridization with the reinvading *ruficollis*. The only other instance I know of is the likely, but unproved, case of hybridization between a Horned

Grebe (*Podiceps auritus*) and an Eared Grebe (*P. nigricollis*) reported by Dennis et al. (1973, Scottish Birds 7: 307). In this case, an adult of each species was observed feeding and carrying a single young.

While studying the recently described Hooded Grebe (*Podiceps gallardoi*) (Rumboll 1974, Com. Mus. Argent. Cienc. Nat. 4: 33), James D. Hammond, Miguel Hinrichsen, Maurice A. E. Rumboll, and I were surprised to observe an apparent hybrid between that species and the Silver Grebe (*P. occipitalis*). For several days we were aware of a rather pale-headed grebe swimming about in close com-