SOME INDIAN MIDDEN BIRDS FROM THE PUGET SOUND AREA

BY LOYE MILLER

At an earlier date (1957) I published the results of a study of some nine thousand bird bones from an Indian midden at The Dalles, Oregon. In consequence, Peabody Museum of Harvard University has more lately invited me to study a comparable collection made by their staff in the Puget Sound area. I am indebted to Mr. Alan L. Bryan of that institution for loan of their material, and for permission to make this study. I have also enjoyed helpful discussions with Dr. Raymond B. Cowles of the University of California at Los Angeles, and with Messrs. Eugene Christman and Wm. J. Hamilton III of the Museum of Vertebrate Zoology at Berkeley, on the subjects of thermals, gliders, and Indian taboos. My thanks are extended to these fellow scientists for their contributions to the work.

The collection here discussed includes about five hundred bones or fragments thereof, which were obtained from nine Indian middens on the shores of Puget Sound. Mr. Bryan refers to them as "shell middens" so I assume that marine shells constitute the major mass. I have little information on fish or mammal remains from the sites, beyond a few mustelid bones and one black bear claw that turned up among the bird remains. Mr. Bryan's correspondence indicates large ungulates to be common, together with small carnivores and marine mammals.

As in the Oregon collection, the bird bones are highly fragmented, for reasons which have thus far eluded me. Curiously, however, a few very fragile bones have been preserved intact. There appears to have been no appreciable mineralization of these bones, such as had progressed to some degree in the Oregon mound. They are stained variously by the matrix but are of firm texture. When held in the Bunsen burner flame they blacken, and give off much smoke of most offensive odor. The Oregon bones reacted very lightly to the flame and gave off little odor. Such evidence as is available suggests much less antiquity for this than for the Oregon site. Charred bones are few, though they are more abundant than in the Oregon collection. The rarity of immature bones suggests that there were no important nesting sites within the radius of the Indians' activities. This is quite in contrast with the Emeryville mound studied by Howard (1929).

The Avifauna

There are many aspects in which the Puget Sound fauna differs from that of the midden at The Dalles. The Washington middens are a salt-water accumulation located in what is known as the Northwest Humid Belt. The Oregon midden is located in the Great Basin Faunal Area, in a semi-arid

TABLE 1
RELATIVE ABUNDANCE OF BIRD FAMILIES BY SITES

Family	Approximate abundance	
	Washington Sites %	Oregon Site %
Gaviidae	14.8	—
Podicipedidae	8.0	—
Pelecanidae	.4	—
Phalacrocoracidae	—	21.8
Anatidae	61.	2.3
Cathartidae	—	16.2
Accipitridae	2.5	27.7
Tetraonidae	.8	.23
Gruidae	.8	—
Rallidae	—	.24
Scolopacidae	.4	—
Laridae	5.9	26.
Alcidae	2.9	—
Strigidae	.4	.49
Corvidae	.8	5.1

environment that is little influenced by the great Columbia River flowing through treeless country. Some faunal differences are therefore to be expected, but not all are so simply accounted for. Table 1 indicates relative abundance of bird families represented in the Washington sites, as compared with the Oregon site.

Unfortunately, the percentages of occurrence in the two mounds are calculated upon slightly different bases, but the over-all picture is not greatly distorted. (The percentages for the Washington sites are based on the number of bones. Those for the Oregon site are based on the number of packages in which the species occur. Exact numbers of bones from the Oregon site are not now available to me.)

DISCUSSION

Some forty years of beachcombing along the Southern California coast and islands have given me a fairly definite picture of what the sea might yield, in the way of birds impaired in vitality or freshly dead and therefore ripe for harvest by various predators. A primitive Indian would surely qualify as one such predator with none too fastidious an appetite. Under stress of food shortage, he might even qualify as a scavenger. It is not unlikely, therefore, that many of the bird bones in our midden represent the food-gathering labor of squaws and children. Every family in Table 1, and most of the genera involved, are represented in my own gleanings as a beachcomber for

skeletal material. Puget Sound is far from the open ocean. Therefore, the shearwaters and fulmars so abundant at times on our beaches, and the Short-tailed Albatross of our Indian middens, are not represented in the Washington collection.

Gaviidae.—Loons of two sizes are abundant, the larger not distinguished from *Gavia immer*. The smaller could include both *G. arctica* and *G. stellata*. Age and sex factors bring about such variation in size and topography of skeletal elements that an unassociated bone, particularly if it be imperfect, is not assignable with confidence to species. I am confident that *G. arctica* is the commoner species, but *stellata* may also be present.

Podicipedidae.—Much the same can be said of the grebe remains. *Podiceps grisegena* and *Aechmophorus occidentalis* are both present. The smaller grebes certainly include *Podiceps caspicus*. Estimates of quantitative relations are not ventured, however.

Pelecanidae.—A single fragment of a humerus is the only record for *Pelecanus*, and there is no cormorant. Both these birds are commonly cast up on the beach, and the cormorant was extremely abundant in the Oregon midden. Both families were abundantly represented in the Emeryville shell mound of San Francisco Bay (Howard, 1929) which, like the Washington sites, was well removed from the shore of the open ocean. Skins of pelicans should have been in demand as clothing for a primitive people, had these birds been abundant in the area. Why the pelicans and cormorants are not well represented is a mystery.

All ciconiiform birds are conspicuous by their absence. Herons, sparingly represented at Emeryville, were also absent from the Oregon midden.

Anatidae.—Geese and ducks were extremely rare among the nine thousand bones from the Oregon site. They made up more than two-thirds of the collection from the Emeryville mound, however; and likewise in the Washington collection they are the most abundantly represented family (61%).

Goose bones are few, but the salt-water and estuarine ducks are in great abundance. The scoters, Canvasback, scaup, Bufflehead, and Mallard all appear. What others may be represented in the great mass of fragmentary duck bones, I feel it unwise to state. The scoters and the Mallard, however, stand out prominently. Jewett *et al.* (1953) mention all these and others as wintering on the Sound in numbers. As a Pleistocene fossil, the Mallard (*Anas platyrhynchos*) is one of the most abundant and widely distributed of ducks. Today it is likewise almost ubiquitous and highly adaptable to varied conditions, including the artificial environment of the barnyard. I look upon it with great respect, as a natural species at the height of its vigor and plasticity.

Cathartidae.—Representatives of this family are conspicuous by their total

absence—much to my disappointment. They were abundant and surprisingly diverse in the Oregon midden, and well represented in the mound at Emeryville. A single condor bone (*Gymnogyps californianus*) was identified from an Indian midden near Coos Bay in southern Oregon (Miller, 1942). The Turkey Vulture (*Cathartes aura*) is a common scavenger about the beaches and estuaries of southern California while the late Pleistocene gravels and asphalts of coastwise California have yielded abundant and varied remains of condors and smaller vultures. They are conspicuous birds in life, and their large quills would make strong appeal to the Indian mind, one would think. How are we to account for their absence from Puget Sound middens? During conversations with colleagues it was suggested to me that cathartids were rare because they find less favorable conditions for their characteristic and essential soaring flight in the coastwise airs, than they do farther inland where rising thermal currents are more frequently available. Such may be the case, but that factor is not so important as to eliminate the group from the fauna of beach, marsh and estuary. Jewett *et al.* (1953) cite many records of condors observed by early travelers to the coastal area, from the mouth of the Columbia River to Ft. Vancouver and into British Columbia at Burrard Inlet. The Turkey Vulture is recorded as breeding at Bellingham, Washington, and in British Columbia. It would seem then that cathartids are, or have been, well known in coastwise Washington within the historical period, and were surely present at the time these Indian middens were being accumulated.

In the paper on the Oregon midden (Miller, 1957) some discussion was ventured concerning the ceremonial usage of condors, eagles, and ravens by Indians of various tribes, and it was suggested that the great abundance of condor and eagle bones in that mound was due to ritual usage. That impression has grown even stronger in my thinking with the passing of time. It is readily conceded, however, that a custom widely spread throughout Oregon, California, and Arizona might have been totally foreign to the ritual of Puget Sound tribes. Mr. Eugene Christman, in conversation, suggested that these large birds may even have been taboo as sacred deities not to be touched by human hands. Again, their remains, if such came to hand, might have been burned or buried in special and remote places. Some such explanation seems more plausible than that these striking species were not present, or were of no interest to a primitive people living as a natural element in the general biota of the area.

Accipitridae.—Even more conspicuous than the cathartids and probably much more abundant along the coasts and estuaries, would be the Bald Eagle (*Haliaeetus leucocephalus*), an inveterate fisherman and beachcomber, not to say pirate. Furthermore, eagles have seemingly appealed to men of all times and tongues. Why not to the Indians? They must have been an im-

portant element in the Puget Sound biota of pre-Columbian times, but only five bones were found in the Washington midden. The eagle is the second most important element in the fauna of the Oregon midden.

The genus *Buteo* is represented by a single bone fragment that is not distinguishable from *B. jamaicensis*. None of the smaller hawks, falcons or the Osprey appears in the collection.

Tetraonidae.—Only two bones of this family are found in the collection, a complete ulna and, strange to say, an almost perfect furcula. Why this fragile "wishbone" should have been preserved when more rugged bones are fragmented is an unsolved question. Likewise, problematic is the small number of bones. They are not distinguishable from the Blue Grouse (*Dendragapus obscurus*), a species that is abundant throughout the state "from sea level to timberline." Its behavior often borders on a state of "stupidity" giving it the widely applied name of fool-hen. My own experience with it would suggest that no great skill or craftiness on the part of a primitive hunter would be necessary to add this acceptable item to his menu on frequent occasions. Were the Indians so well supplied with maritime food species within the immediate vicinity that they made no short forays into the freshwater brushlands adjacent to camp? The presence of abundant ungulate bones would oppose such suggestion.

Gruidae.—An imperfect coracoid and the distal condyles of a right tibiotarsus represent a crane somewhat larger than the average of the race *Grus canadensis canadensis*. Cranes were lacking in the Oregon midden but were fairly well represented in the Emeryville mound.

There are no rail or coot bones. The widely ranging and abundant American Coot (*Fulica americana*), though preferring fresh water during the nesting season, is not uncommon in winter on sea coasts and estuaries. I was surprised not to find it in the Puget Sound collection.

Laridae.—In view of the tremendous number of gull bones recovered from the Oregon midden it is surprising to find that they are so rare in the Washington collection. The Oregon midden is located on the south bank of the Columbia River east of the Cascade Range. There is no quiet water there at present and no extensive beach, although there is some indication of a small diverticulum of perhaps intermittent nature that once provided quiet water at certain seasons. The Washington middens lie at the mouth of Puget Sound practically at tide level where gulls should be extremely abundant. Since marine shells make up the major part of the midden refuse, perhaps we might conclude that gulls were not tempting to the Indian appetite. Still, loons and grebes are of frequent occurrence, though possibly these were brought into camp for their densely feathered skins to be used as "raincoats."

Alcidae.—The auks and murres are even less abundant than the gulls, and

all bones are from mature birds. Seemingly there were no nesting colonies nearby.

Scolopacidae.—A single bone represents the great group of the shore birds.

Strigidae.—The owls are represented by a single bone of the Great Horned Owl (*Bubo virginianus*). The immediate environment was probably not attractive to the owls, nor would their flesh strongly attract the Indian except perhaps as "medicine." The bones of large ungulates and bear, however, indicate that the Indians hunted farther afield. Numerous petroglyphs on rocks near the Oregon site indicate an awareness of owls. Probably a superstitious fear made the Indian avoid close contact with these birds.

Corvidae.—Two bones of a crow not distinguishable from *Corvus caurinus* are the only representatives of the passeriform birds. Jewett *et al.* (1953) state, "Great numbers of Northwestern Crows are to be observed along the ocean beaches, the Strait of Juan de Fuca, and in the Sound region." They become almost domestic at times so must have been frequent camp "hangers-on" of the midden sites. Despite an uncanny ability to take care of themselves they must have been occasionally available had the Indians cared to make use of bodies or feathers. Like the owls, they must have been shielded by Indian psychology.

This paper represents a study of bird remains actually in hand—a study made by an ornithologist interested in living, active, flying creatures grouped into a fauna that had developed through the years in response to a set of environmental factors held in delicate balance by variable forces, any one of which may be responsible through its own variability for an imbalance that could distort the whole picture. A primitive race of the natural species *Homo sapiens* had been for some thousands of years an element in the ecologic environment at the Puget Sound site. Did he exert a pressure of some magnitude? I doubt it. He was not a planter, not a herdsman, not a destroyer of the landscape by fire, by cutting or trampling of large areas. He was a simple fisherman and hunter of limited prowess. The picture he painted on the sands of his own "kitchen midden floor" is frustratingly incomplete. Yet some of its lines are fascinating.

Literature Cited

Howard, H.
1929 The avifauna of Emeryville shell mound. *Univ. Calif. Publ. Zool.*, 32:301–394.

Jewett, S. G., W. P. Taylor, W. T. Shaw, and J. W. Aldrich
1953 The Birds of Washington. Univ. Wash. Press.

Miller, A. H.
1942 A California Condor bone from the coast of southern Oregon. *Murrelet*, 23:77.

Miller, L.
1957 Bird remains from an Oregon Indian midden. *Condor*, 59:59–63.

ZOOLOGY DEPARTMENT, UNIVERSITY OF CALIFORNIA, LOS ANGELES, CALIFORNIA,
JULY 25, 1959