

The volumes of *M. supracoracoideus* and *M. coracobrachialis posterior* were measured in all the genera of the *Cathartidae*. Expressed in per cent of total volume of the wing musculature, the volumes of *M. supracoracoideus* are: *Vultur*, 7.3; *Coragyps*, 6.5; *Sarcoramphus*, 5.8; *Gymnogyps*, 5.1; and *Cathartes*, 4.4. Judging from the ratios of Table 1, the series in order of decreasing development of *M. supracoracoideus* would be *Cathartes*, *Sarcoramphus*, *Gymnogyps*, and *Coragyps*. From Table 2, the same series is *Sarcoramphus*, *Cathartes*, *Coragyps*, and *Gymnogyps* (no coracoids of *Vultur* were available). Thus it appears that in the New World vultures the position of the line on the coracoid is not an index to the volume of the muscle which, in turn, is the best gross index to its power. The volumes of *M. coracobrachialis posterior*, expressed in per cent of total volume of wing musculature, vary between 0.93 per cent in *Sarcoramphus* and 1.16 per cent in *Gymnogyps*, a negligible range of some 0.2 per cent. These figures indicate that *M. coracobrachialis posterior* does not vary inversely in its developments with *M. supracoracoideus*.

Consequently, it seems necessary to discard the anterior intermuscular line on the coracoid as an index to the ability to fly. There are too many complications in the form of synergistic actions of the muscles and in the stimuli supplied to them through the nervous system for any such simple criterion to be significant.

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SOME CHANGES IN THE BIRD LIFE OF CHURCHILL, MANITOBA

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ON May 1, 1934, P. A. Taverner and G. M. Sutton published a carefully prepared, annotated list (1) of the birds that had been recorded from Churchill, Manitoba, up to July, 1933. In 1934, I spent the month of June at Churchill studying ptarmigan (2) in the interest of the American Game Association and found this list most useful, while my observations on the relative abundance of the various species checked rather accurately with those reported by Taverner and Sutton. Ten years later, 1944, I spent most of the month of June again at Churchill, under the auspices of the National Geographic Society, this time with my son David, and since the status of certain species seems to have changed in this interim and since the area will probably undergo additional changes, it seems advisable to report our observations at this time.

David and I arrived at Churchill on June 7 and during the first week we enjoyed the company of Frank A. Farley of Camrose, Alberta, veteran egg collector, who had made several previous trips to Churchill. During the last week of our stay, June 22 to June 28, we were accompanied by William Carrick of Toronto, a sergeant in the Canadian Air Force, who had come to Churchill to photograph birds.

With the completion of the railroad from Winnipeg to Churchill in 1929, the nesting ground of the Harris's Sparrow and a number of shorebirds, whose eggs were great rarities, at that time became available to collectors and perhaps no similar area has received more intensive egg-collecting in recent years.

With the entrance of the United States into the World War, still greater catastrophes befell Churchill, for there was an influx of 3,500 workmen for the installation of a modern airport and for the building of a wide gravel road through the heart of the nesting grounds. From there it extends some miles south to Landing Lake. Deepened ditches have drained the town-site somewhat more effectively than formerly and much of the area from the town to the reservoir has become drier. Most of the dwarf spruces that dotted this area have likewise been cleared off.

In building the landing strips, spruce-covered ridges that represented ancient beaches were levelled off so that this part of the Churchill area is no longer recognizable by those who knew it in the pre-war days. In spite of all these happenings, it was interesting to discover birds like the Hudsonian Curlew, Eastern Dowitcher, and Red-backed Sandpiper fully as numerous as in 1934, with the Curlews and Dowitchers considerably more abundant. Of the rarer shorebirds, only the Stilt Sandpipers seemed somewhat less common.

Of the 142 species of birds listed by Taverner and Sutton as of regular or accidental occurrence at Churchill, we recorded 75. Most of those not recorded are either accidental or transients that would not normally be seen during the period of our visit. In addition to the 75 species previously recorded, we observed seven not included on the Taverner-Sutton list, as follows. None of these was collected but they represent common species familiar to the observers. The exact subspecies, where several have been recognized, cannot, of course, be vouched for.

ALDER FLYCATCHER, *Empidonax t. traillii* (Audubon).—One singing male observed on June 12 by David Allen at timberline south of the reservoir.

BARN SWALLOW, *Hirundo rustica erythrogaster* Boddaert.—One adult male seen by the author June 17 flying over the town with a pair of Tree Swallows that was nesting in a bird house.

HOUSE WREN, *Troglodytes aëdon* Vieillot.—A male House Wren was first seen and heard singing by David Allen near some old army hospital buildings south of the reservoir on June 21. It was heard by the author on the following day not far from the same spot.

STARLING, *Sturnus v. vulgaris* Linnaeus.—A flock of four first seen by the author June 12 circling over a pond at timberline south of the reservoir. When I 'squeaked' they alighted in the spruces within fifty feet of me. On June 15 in the same area, three were seen again flying together, one of them having lost its tail.

COWBIRD, *Molothrus ater* (Boddaert).—On June 10 in the same general area where the Starlings were later seen, a female Cowbird was observed twice. The first time it was being chased by a Rusty Blackbird and the second time by a male Red-wing.

RED-WING, *Agelaius phoeniceus* (Linnaeus).—An adult male was first seen June 10 and repeatedly thereafter in the alder-spruce swamp which constitutes the edge of timberline just south of the reservoir.

SONG SPARROW, *Melospiza melodia* (Wilson).—A male Song Sparrow in full song was seen by the author on June 10 along the new road south of the reservoir. It apparently moved on for it was not heard again although we were often in this same area.

It might be well to record here, also, a Philadelphia Vireo (*Vireo philadelphicus*) seen June 29, 1934, at the edge of timberline just south of the reservoir and not previously reported.

The occurrence of these species that are common a few hundred miles to the south may have no special significance at this time. Possibly, however, they are another indication of a widespread movement of southern forms northward that seems to be occurring farther south in eastern United States and southern Canada. Cardinals, Carolina Wrens, Orchard Orioles, and Tufted Titmice, for example, seem to have increased considerably in central New York and southern Ontario in the last ten years. The occurrence of the Starlings is, of course, merely a part of that phenomenal extension of range that has been taking place during the past twenty years. This is probably the farthest north they have been recorded in North America and it bodes ill for the few Flickers that manage to excavate their nesting cavities at this northern latitude.

Of the eighty-two species observed, nests were found of 38 and it was interesting to discover certain nests on the same spots where they had been observed and photographed ten years before. This was to be expected on the Arctic Tern islands but it was a surprise to find the Arctic Loon's eggs within a few feet of the pegs that staked out the photographic blind of the previous trip; to find the lone Herring Gull's nest of the reservoir area still on the same large boulder and to observe the same stretches of tundra moss supporting Golden Plovers in about the same spots. Apparently conditions are so nearly static in this near-arctic environment that the passage of ten years

means little. Such changes in the bird life as were noted, therefore, are probably the result of changes elsewhere. The pronounced increase in Hudsonian Curlews and Dowitchers and the slight increase in Hudsonian Godwits could well be explained on the basis of the protection which they have been receiving farther south in recent years.

No effort will be made to list all the birds observed. Only those whose status seems to have changed or whose rarity makes them worthy of mention, will be included.

HORNED GREBE, *Colymbus auritus* Linnaeus.—Two nests of this more southern species were found in the grassy sloughs on either side of the road running from the reservoir to the airport.

PIED-BILLED GREBE, *Podilymbus podiceps* (Linnaeus).—One bird was seen and frequently heard calling in the same slough with the Horned Grebe south of the road.

CANADA GOOSE, *Branta canadensis* (Linnaeus).—Six nests were found and other pairs noted indicative of quite an increase in the nesting population.

BLUE-WINGED TEAL, *Anas discors* (Linnaeus).—A female of this species being tormented by five male Green-winged Teals was observed south of the reservoir. It took refuge under the roots of a dead spruce standing at the edge of a ditch and flushed from nearly under foot.

GOLDEN-EYE, *Glaucionetta clangula* (Linnaeus).—A female of this species was seen on June 16 circling around the town-site as though it were inspecting the various chimneys as possible nesting sites. It was later seen several times on the town-site slough.

WHITE-WINGED SCOTER, *Melanitta fusca deglandi* (Bonaparte).—Several pairs sat around together on Lake Isabelle during the latter part of June as though nesting, and one nest with six fresh eggs was found on June 27 on one of the tern islands. This seems to be the first definite nesting record for the area. The same small island had a nest of the Red-breasted Merganser containing thirteen eggs, one of an Old Squaw with seven eggs and an Arctic Loon's nest with one egg. The status of the other waterfowl seemed unchanged from that reported by Taverner and Sutton.

WILLOW PTARMIGAN, *Lagopus lagopus* (Linnaeus).—This species seemed notably scarcer in 1944 than it was in 1934 which was one of its peak years. Only two nests were found and one other brood of young seen. Not more than ten males were observed during the three-weeks period.

SANDHILL CRANE, *Grus canadensis* (Linnaeus).—A single bird was observed several times between June 21 and 24 a mile south of the reservoir, and once a pair was seen by David Allen but no nest was found.

KILLDEER, *Charadrius vociferus* (Linnaeus).—This species apparently has increased, for it could no longer be considered "uncommon." Five or six pairs were observed.

HUDSONIAN CURLEW, *Numenius phaeopus hudsonicus* Latham.—This species was reported as common by Taverner and Sutton but it was definitely more numerous in 1944 than in 1934. We estimated that there was at least one pair for every quarter mile of tundra. One could not leave the territory of one pair without immediately being scolded by the next ones.

SPOTTED SANDPIPER, *Actitis macularia* (Linnaeus).—Several pairs were noted around the town-site slough and the reservoir area—a noticeable increase over 1934.

DOWITCHER, *Limnodromus griseus* (Gmelin).—This species seems to have increased considerably, especially about the grassy slough south of the road from the reservoir

to the airport, where perhaps ten pairs were nesting although only three nests were found—June 12, June 14, and June 20.

STILT SANDPIPER, *Micropalama himantopus* (Bonaparte).—Taverner and Sutton reported this as one of the commonest of the breeding shorebirds, but in 1944 it was about eighth on the list and we found only four nests. In the order of their abundance in 1944, I should list the breeding shorebirds about as follows: 1, Semipalmated Sandpiper; 2, Least Sandpiper; 3, Semipalmated Plover; 4, Hudsonian Curlew; 5, Northern Phalarope; 6, Lesser Yellow-legs; 7, Wilson's Snipe; 8, Stilt Sandpiper; 9, Red-backed Sandpiper; 10, Dowitcher; 11, Golden Plover; 12, Killdeer; 13, Spotted Sandpiper; 14, Hudsonian Godwit.

TREE SWALLOW, *Iridoprocne bicolor* (Vieillot).—At least two pairs nested on the town-site, one in a bird house, and they were occasionally noted elsewhere. This is possibly a slight increase.

AMERICAN ROBIN, *Turdus migratorius* Linnaeus.—This species seemed definitely to have increased since 1934, and many nests were found in the low spruces at timberline as well as about the town-site and the airport.

NORTHERN SHRIKE, *Lanius excubitor borealis* Vieillot.—David found a nest with well-fledged young in the top of a spruce, June 8. Later, at least four other family parties were observed, an apparent increase over previous records and my own 1934 observations when none was seen.

WESTERN MEADOWLARK, *Sturnella neglecta* (Bonaparte).—On June 7 and 8 a single male of this species was in full song near this town-site slough but was not seen nor heard later.

COMMON REDPOLL, *Acanthis flammea flammea* (Linnaeus).—This species seemed much less common than in 1934, and although it was seen nearly every day, only two nests were found.

TREE SPARROW, *Spizella arborea* (Wilson).—This species, likewise, seemed much less common than in 1934, especially around the town-site where it was seldom seen.

HARRIS'S SPARROW, *Zonotrichia querula* (Nuttall).—This species seemed somewhat less common than in 1934, although it was present in all suitable habitats. Only four nests were found.

LAPLAND LONGSPUR, *Calcarius lapponicus* (Linnaeus).—This species, while still fairly common, had dropped considerably in abundance, while the Smith's Longspur had increased, until in many places on the tundra remote from the town-site, the Smith's Longspur was the more common species. This was not the case in 1934 when the Lapland Longspur was abundant everywhere.

In conclusion, may I express my appreciation to Major Sam Wilkins, of the U. S. Army, who provided us with the freedom of the restricted area for our studies at a time when even the presence of an airport at Churchill was held secret. By the time this note is published, its presence and the part the U. S. Army had in developing it will be common knowledge. May we hope that the continued presence of the airport will have no greater effect on the bird life of this most interesting region than did its inception and development. May it, indeed, become a stepping-stone for naturalists who wish to carry on studies of the bird life still farther north about the airports of real arctic America.

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