The Auckland Islands Merganser

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Of the ducks that have become extinct within the last hundred years (Pink-headed Duck *Rhodonessa caryophyllacea*, Labrador Duck *Camptorhynchus labradorius*, Coues' Gadwall *Anas strepera couesi*, Auckland Islands Merganser *Mergus australis* and Crested Shelduck *Tadorna cristata*), only the Merganser inhabited the southern hemisphere. During the 60 or so years between the first and last sightings of living birds of this species, few observations were made or specimens collected. The most readily available account, in Delacour (1959), contains some errors and was not intended to be detailed. In addition, the illustration of the downy young in the same work is inaccurate. The object of this paper, like that of Salim Ali's on *Rhodonessa* (1960), is to review the literature, to consider the species' original distribution, and to list for future workers the specimens preserved in world museums.

Description

Adult (Plate XIIb, p. 97)

Sexes alike but males distinguished by their larger size, longer bill and crest, and some slight plumage characteristics. Head, crest and neck very dark brown with chin and throat somewhat lighter. Mantle, scapulars, back, rump and tail very dark bluish-black. Breast dull grey with a few lighter crescentic markings; remainder of lower surface grey and white except for the flanks which are uniform dark blue-grey. Wing-coverts slate-grey, like the sides of the breast, with the lower row darker and banded white. Middle secondaries white on the outer web and black on the inner web and tips. Primaries and inner secondaries black. Males are perceptibly more rufous in the plumage of the crown, and have two white wing bars instead of one (R. A. Falla pers. com.).

Iris dark brown. Culmen and tip of lower mandible black; cutting edge of upper mandible and rest of lower mandible yellowish-orange; legs and feet orange; joints and webs (above and below) dusky (Gray 1844-45; Hutton and Drummond 1905; Phillips 1926).

Males: wing 186-220 mm., culmen 60-61 mm., tarsus 42-44 mm., tail 85-90 mm., crest 5.6 mm., mid-toe 77 mm.

Females: wing 176-180 mm., culmen 53-55mm., tarsus 40-42 mm., tail 74 mm., crest 4.6 mm., mid-toe 56 mm. (Ogilvie-Grant 1905; Phillips 1926; Oliver 1955; Delacour 1959; and original).

Immature

A shorter crest or no crest at all, no crescentic markings on the breast; the middle of the lower breast and abdomen conspicuously white with few dusky mottlings (Salvadori 1895).

Downy young (Figure 1)

Dark, almost black, above with only a trace of pale wing, scapular and dorsal rump-spots. Chin, throat and upper breast rusty chestnut, with a spot of chestnut beneath the eye and no white streaking on the face. Remaining underparts yellowish-white. Bill dark olive, brown on the ridge and tip. Feet olive brown.

Distribution

When first collected by Monsieur Jacquinot in 1840 (Hombron and Jacquinot 1841), the Merganser was confined to the Auckland Islands (latitude 51°S. and 166°E., about 200 miles SSW. of New Zealand; 234 sq. miles in extent). However, a subfossil mandible was found in 1945 among ancient kitchen refuse (middens) of moa-hunting Polynesians at Wairau Bar, Marlborough, in the South Island of New Zealand. Seven years later a premaxilla and cranium were discovered among dune deposits, probably wind-blown from middens, at Lake Grassmere. A number of other subfossil limb bones, certainly attributable to *Mergus* and listed in Appendix I, have been found at or near the same sites, and on Stewart Island. Until more material is available the specific status of the New Zealand bones must remain in abeyance. The skull elements are virtually identical to recent material from the Auckland Islands. The measurements of two *M. australis* skeletons in the British Museum (Humphrey 1955) also compare well with those of mainland limb bones, except for the humerus (Museum number AV 19563). This has a length of 82 mm. compared with 70.9 mm. for the male and 67 mm. for the female *M. australis*. The greater

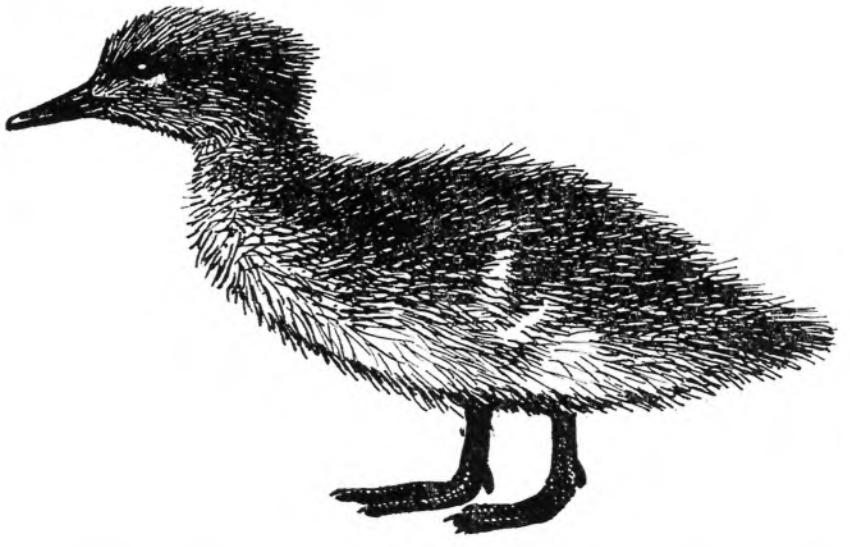

Figure 1. The downy young of *Mergus australis*. Drawn by Peter Scott from photographs of the skins in the Canterbury Museum and the American Museum of Natural History.

length suggests that the New Zealand form may have been a larger bird, possibly ancestral to the Auckland Islands species.

Figure 2 shows the localities in New Zealand and adjacent islands from which *Mergus* has been reported. Oliver (1955), quoting McCormick (1842), stated that Mergansers had also occurred on Campbell Island, 200 miles east of the Aucklands. Westerkov (1960) found McCormick's wording, that the water birds of Campbell Island 'consist of a New Zealand species of duck, a Merganser, a species of *Phalacrocorax* . . .' insufficient evidence that the Merganser ever existed and thought it resulted from confusion with Mergansers seen on Auckland Island. It is certain, in any case, that the species had not the very restricted distribution sometimes suggested (Johnsgard 1968).

Food and habitat

Information on the normal habitat of the bird is scanty. Captain J. Bollons (in Waite 1909) had not seen the bird on the coast, but had found it occasionally at the head of the estuaries and especially on the island watercourses 'picking about in the creeks'. J. S. Myers (quoted in Phillips 1926) also thought the bird an inland species, occurring on the considerable rivers of the interior and rare on the coast. Hutton and Drummond (1905), on the other hand, called it New Zealand's only sea duck, although 'it does not frequent the coast and open waters but only the sheltered harbours'. They instanced the occasion, presumably in January 1901 (since Hutton was not on the second trip in January 1902 (Ranfurly unpub.)), when Lord Ranfurly was collecting birds in the Auckland Islands and an old drake Merganser flew out from the shore to the steamer where it was anchored close in for the evening. It settled on the water within a few yards of the vessel and swam calmly about 'quacking like a domestic duck' (which suggests a misidentification of the sex, since in northern mergansers only the female quacks). The account of Reischek (1889), in which he recorded the sighting of six Mergansers, also suggests that they were near the coast, as he mentioned them in association with obviously marine birds. McCormick (1884) saw Mergansers in Laurie Harbour, at the north end of the main island, in November 1840. All the specimens for which a habitat is given came from Carnley Harbour, usually off the north shore of Adams Island, or the inlets along the eastern coast. Dr. R. A. Falla (pers. com.)

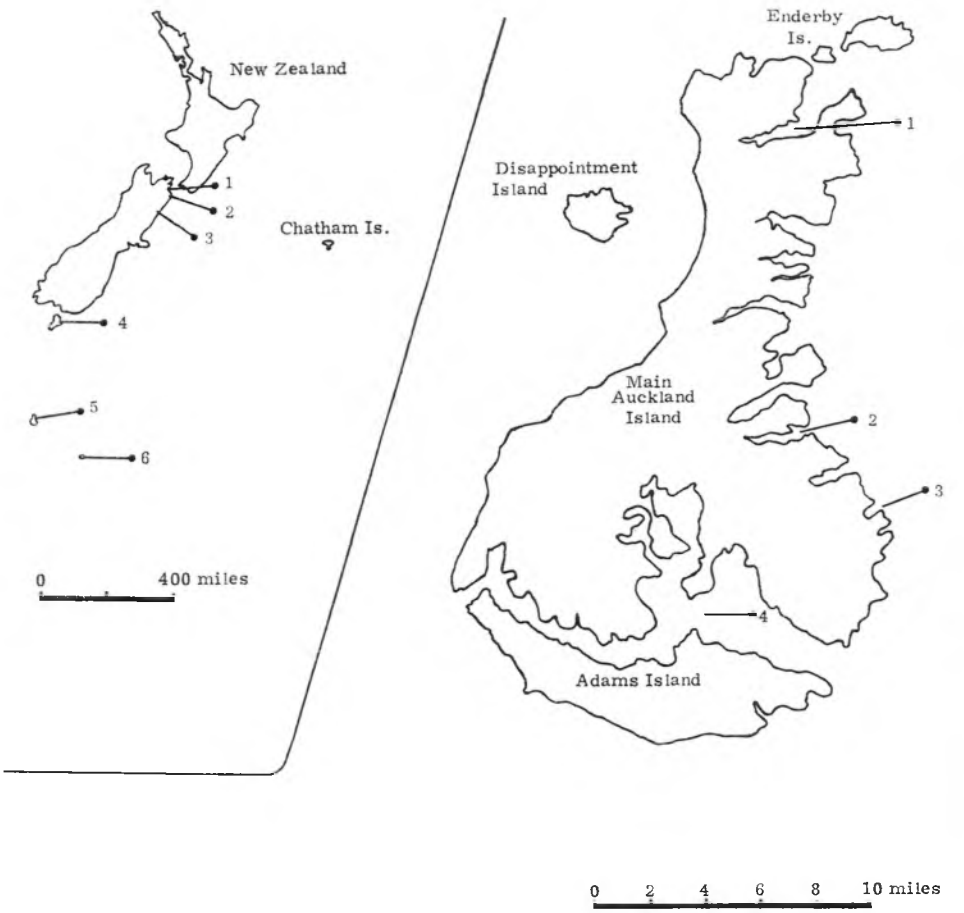

Figure 2. The distribution of subfossil bones of *Mergus*, and of *Mergus australis* records, in New Zealand and adjacent islands. In the left-hand map: 1. Wairau Bar, 2. Lake Grassmere, 3. South Bay, 4. Old Neck, Stewart Island, 5. Auckland Islands, 6. Campbell Island (reported by McCormick (1842)). In the right-hand map of the Auckland Islands: 1. Laurie Harbour, 2. Waterfall Inlet, now called Hanfield Inlet, 3. McLennan Inlet, 4. Carnley Harbour.

obtained precise locality data from Major Wilson who shot two Mergansers in 1891 in a steep gully which came to the sea through low forest. 'Wilson told me that he actually climbed up the stream bed for some distance and came across the two birds on a deep pool where the stream course was partly dammed on a rocky terrace. There is very high and year-round precipitation and the larger streams which come out in the heads of inlets debouch into estuaries of much reduced salinity, where Mergansers could get a range of suitable food. In general, I think the evidence for believing the Merganser a marine species is very tenuous.'

Almost the only clue to the food of the Merganser is the repeated statement that it took freshwater shrimps (Phillips 1926; Delacour 1959; Greenway 1967). Phillips and Greenway attributed the original report to Waite (1909) and Delacour to Wayne (undated). Waite (1909) made no reference to shrimps; he did however mention an earlier paper by Hutton (1902) which described an Auckland Islands fish *Galaxias bollansi* (= *brevipennis*) 90 mm. long and 14 mm. wide, taken from the mouth of a Merganser in January 1901, and assumed to be marine. Waite thought a marine habitat unlikely and quoted Bollons (after whom the fish was named) as saying that he had never seen the duck feeding close to the sea. Hutton and

Drummond (1905) again stated that the Merganser was a fish-eater and added that it caught its prey by diving.

The gut of the preserved Auckland Islands Merganser at the British Museum contains only macerated fish bones, the mandibles of an errant polychaete (*Nereis*?) and an unidentified gastropod (P. J. K. Burton pers. com.). The presence of the polychaete tends to suggest a brackish water environment.

Breeding biology

The Auckland Islands Merganser showed a number of features, besides tameness, common to waterfowl isolated on relatively remote islands. There was no trace of a conspicuous male plumage (both sexes resembling the female Red-breasted Merganser *Mergus serrator* or Goosander *M. merganser*) and therefore no male eclipse. In body size the species was small; smaller than any other merganser. It also differed in having a more slender bill and shorter toes (Mathews and Iredale 1913; Humphrey 1955).

The pair bond may have been a long-term one, extending beyond the only recorded egg-laying period which, extrapolating from the date when 7- to 10-day-old ducklings were 'seized' (Chapman 1891), must have been at the end of November or beginning of December. Both parents were present when these ducklings were taken, and adult birds were apparently shot in pairs in October (R. A. Wilson 1959), in November (Hügel 1875), in January (Reischek 1889), and perhaps in May (Buller 1905) and July (Ogilvie-Grant 1905). No moulting specimens seem to have been taken. The nest site, the egg and the clutch size were never described. The only brood ever seen apparently consisted of four ducklings.

The downy duckling shows the same darkening and loss of pattern typical of other island species (for example Laysan Teal *A. platyrhynchos laysanensis* and New Zealand Brown Teal *A. aucklandica chlorotis*) when compared with their supposed ancestral types. The adaptive advantage of the normally patterned down is not entirely understood. Possibly it is disruptive and so helps in concealing the animals from ground and aerial predators.

Reasons for extinction

The disappearance of the Merganser from what was probably its centre, mainland New Zealand, can perhaps be ascribed to pre-European man, especially as *Mergus* bones have been found at middens of the moa-hunting Polynesians. Remains of four other extinct New Zealand waterfowl species are associated with early Polynesian artifacts, and hunting has usually been assumed as a contributing factor in their extinction (Williams 1964). Destruction of habitat by fire and the introduction of 'Maori' dogs and rats (Fleming 1962a, 1969) may also have taken their toll. Years of isolated evolution in a land with no mammals except seals and bats must have produced a 'tameness' and lack of guile that proved disastrous after ground predators arrived. Two adults shot in 1888 did not even attempt to dive to escape (Reischek 1889). The species was probably not without natural predators, even on the Aucklands. Rails may have taken eggs. Skuas, falcons and large fish, especially eels, might have taken ducklings. Sea lions were almost certainly predatory; unlike the other wildlife they were not 'tame'. One of them made a 'vicious attack' on Lord Ranfurly, and he and his party were out on a 'Lion Hunt' for a particularly dangerous animal when the last pair of Mergansers was shot (Ranfurly unpub.). Dr. R. A. Falla (pers. com.) believes that the only real hazard for young Mergansers would have been to spend too much time on water deep enough for sea lions to operate. They continue to take a large toll of the prolific shags, 'especially of immature birds early in their swimming and diving careers. As they cough up the indigestible feet and beaks I imagine that the serrated bill of the merganser would not have worried them.' The fact that the downy Merganser retained a pale belly while the upper parts darkened so much, perhaps indicates some value in camouflage from beneath. On the other hand, the simple counter-shading of dark above and light below may also have been adaptive to a fish-catching habit.

The Auckland Islands were discovered on 18th August 1806 by Captain Abraham Bristow and named after Lord Auckland, an English politician. The islands were granted by the British Government to a private company as a whaling station which was, however, abandoned in 1852. Other European and Maori settlements, numbering two or three hundred persons at times, were started on the main island but did not last long (McLaren 1948; Wright 1955); some inhabitants died of starvation in 1864 (Ranfurly unpub.). Pigs were introduced in 1807 (Waite 1909), sheep and goats later (Chapman 1891)

and mice came ashore with the many wrecks that occurred after sealing and whaling stations were established (Greenway 1967). Rats may have been introduced in the same way, although they are absent now (C. A. Fleming pers. com.). Sailing ships, which took the great circle route to Tahiti, also passed close and some came to grief on the rocks. There were three shipwrecked parties in the 1860's alone (R. A. Falla pers. com.). Reischek (1889), during his visit in January 1888, noted not only numerous rabbits but also wild dogs, and Lord Ranfurly's party in January 1901 shot 30 rabbits on Enderby Island and a couple of pigs on the main island. At the Earl's second visit in January 1902, the steamer brought a few men and one woman with three small children, one in arms. 'She had not the vaguest idea what she was going to and thought she would find shops on the Islands. Her husband at the time was alone there with a Maori looking after sheep. We also carried a cow, calves and some sheep' (Ranfurly unpub.). Cats likewise became fairly common after 1850 and are still widespread. Thus, Delacour's statement (1959) that the islands were seldom visited and, because no dangerous animals had been introduced, primitive life conditions were unchanged, seems unduly optimistic. However, the Merganser's last refuge, Adams Island, which has an area of 35 sq. miles and borders Carnley Harbour on the harbour's southern side, has always been uninhabited (Williams 1964), although sealers' huts seem to have existed (Chapman 1891). No predators were introduced as far as is known, but ships were wrecked there and, of course, mice and dogs do swim. Martin (1886) advised that the Aucklands be set aside as a reserve but it was by then probably too late to remedy the situation.

The total Merganser population was not great, even in pristine times. The main island has more than thirty suitable streams, many with waterfalls and terrace pools, a few even with small lakes along their courses. Adams Island has ten streams, more restricted in size and area, and no estuaries. From this, Dr. R. A. Falla (pers. com.) suggests that, with two or three breeding pairs on each watercourse, a few hundred birds all told would have been an optimum population under original conditions.

The Auckland Islands were probably at the extreme edge of the Merganser's range; it had reduced wings (Humphrey 1955) but, according to Hutton, could fly well. (The statement of Luther (1967) that it was flightless is an error, perhaps arising from Gray's curious use of *Nesonetta aucklandica* as a synonym for *Mergus australis* (Gray 1844).) On the islands it may have met conditions of climate or food supply to which it was relatively ill-adapted, and the isolated colony perhaps succumbed to 'natural causes', greatly accelerated by man's interference with the habitat. Populations of New Zealand Shoveler *Anas rhynchotis variegata* (Williams 1964) and Shelduck *Tadorna variegata* have likewise disappeared from the Chatham Islands (400 miles ESE. of New Zealand), although the species still hold their own on the mainland of New Zealand. The ultimate reason for the Merganser's extinction may well have been the relatively large number of individuals that was shot during 1901 and 1902.

A restricted food supply is another possible cause for the Merganser's extinction, since it had specialised feeding habits, although in Humphrey's opinion (1955) no more specialised than other mergansers. No other diving duck occurred in the Aucklands to provide competition (there is a doubtful record of the Blue Duck *Hymenolaimus malacorhynchus* (Waite 1909) which in any case failed to survive and is not a fish-eater). Plenty of fish-eating birds, especially cormorants, do occur however. *Galaxias bollansi*, the largest known food item, is found only in New Zealand and neighbouring islands, where recorded sizes range from 73 to 210 mm. (Regan 1905; Scott 1935). There is no record that its populations were low enough to affect the numbers of any predator, and all the streams are still well stocked (R. A. Falla pers. com.).

Nest sites are not likely to have been a problem. Other mergansers are either tree-hole nesters or build among rocks on the ground, and natural cavities of both kinds would be common on the Aucklands. However, if *M.australis* were a ground nester, and Humphrey (1955) had good reason to believe it was, the many introduced mammals would have been a real danger during the breeding season. Waite (1909) emphasised that 'there can be small doubt that the introduction of pigs to the Auckland Islands has already resulted in considerable havoc among the ground-nesting birds, by destroying both eggs and young'. There are areas on the main island which, because of difficulty of access, are pig-free, but with the worse hazard of cats, it is remarkable that

there were still Mergansers left to be shot in McLennan Inlet in 1901.

Origin of the species

The only other merganser in the southern hemisphere is the Brazilian *M.octosetaceus*, which, according to Johnsgard (1965), has an earlier origin than the northern species, with several unusual features. Here also the pair bond appears to be long and the sexes are alike, but both resemble the *males* of northern forms, having shiny green plumage. Ducklings have the incomplete breast band and streaked cheeks typical of all other mergansers except *M.australis*. The Auckland Islands species, on the other hand, is best thought of as an isolated derivative of a northern form which secondarily lost dimorphism and bright plumage in the drake. The Goosander, Chinese Merganser *M.squamatus* and *M.australis* are indeed very closely related — much more closely related to one another than to any of the other mergansers (Humphrey 1955). Humphrey based his assertion principally on the structure of the male trachea, but other features such as plumage characteristics, position of the nostril and skeletal proportions were also considered.

At present, *M.squamatus* in China most closely approaches New Zealand (although still many thousands of miles away). Unlike much of the native New Zealand avifauna, there is no suggestion that the Merganser arrived via Australia (Falla 1953; Fleming 1962b). Two of the seven present day indigenous waterfowl, New Zealand Scaup *Aythya novaeseelandiae* and the Blue Duck, likewise have no close relatives in Australia, and even the New Zealand Shelduck may more nearly resemble the species occurring in South Africa (Johnsgard 1965).

Specimens collected

Some 26 skins exist in ten museums and are listed in Appendix II. These include four ducklings and at least 12 males and nine females of which four may be juveniles in first plumage. Three nearly complete skeletons, various skeletal parts and one carcass in pickle are also available.

The first specimen was collected in 1840 (not 1839 as stated in Oliver (1955)) probably between 11th and 20th March (d'Urville 1846). There seems to be considerable disagreement about the date of the last sighting. Greenway (1967) gave 1901, while Jouanin (1962) wrote that the bird had not been collected or seen since the expeditions of Lord Ranfurly in 1901 and 1902. Fleming *et al.* (1953) stated that the bird has probably been 'extinct since 1905'. Fisher and Peterson (1964) and the I.C.B.P. list (1966) gave 1905 as the last record, while Delacour (1959), Howard (1964) and Johnsgard (1968) indicated that a bird was taken in 1909. Delacour indeed identified Waite as the 1909 collector. However, during his trip in 1907 he kept a sharp look-out but saw no Mergansers (Waite 1909), and no skin presented by him exists today in the Canterbury Museum of which he was Curator from 1906-14, in succession to Hutton. Edward Wilson visited the Auckland Islands in March 1904, with Captain Scott, on the *Discovery*'s return from Antarctica. During a fortnight's stay, he made an intensive study of the island's natural history and attempted to make as complete a collection of birds as possible. When the ship sailed, however, he had to note that none of the company had seen Mergansers (E. A. Wilson 1967).

After Waite's visit, the next thorough search seems to have been made in 1927 by Oliver (1955). Dr. R. A. Falla reports similar unsuccessful investigations by himself and fellow coast watchers from December 1942 to January 1944. It seems almost certain that the Merganser is extinct and the last sighting was either of a pair shot by Mr. Shattock on 9th January 1902 (Ranfurly unpub.), now probably skeletons in the British Museum, or of the specimen in the Dominion Museum, Wellington, labelled 'June 1902'. There is, however, some possibility that this latter bird was collected earlier.

Acknowledgements

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Summary

The paper summarises what is known of the extinct Auckland Islands Merganser *Mergus australis*. It was a small, short-winged bird, with little sexual dimorphism except in size, distributed at one time in at least the south island of New Zealand, the Auckland Islands and perhaps Campbell Island. Its habitat seems to have been sheltered inlets and streams, and the principal item of diet was small fish. The egg-laying season included the period of November/December and the pair bond seems to have been a long-term one. The ducklings were dark in colour except for the belly and were unpatterned, as in many island forms. The species' extinction is considered to have been largely due to Man. Specimens taken between 1840 and 1902 and now housed in world museums are listed.

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Appendix I. Subfossil *Mergus* bones from New Zealand. (In the collections of the Canterbury Museum.)

AV 11600: Premaxilla from sand-dunes, Marfell Beach, Lake Grassmere, Marlborough. Coll: J. Britton, 1952.
AV 11532: Cranium, same site. Coll: R. J. S., 1952.
AV 12977: R. tarso-metatarsus, same site. Coll: R. J. S., 1952.
AV 13512: Two R. and one L. tibio-tarsi from moa-hunter midden, Old Neck, Stewart Is. Coll: R. J. S., 1954.
AV 13548: R. tibio-tarsus, same data.
AV 13649: L. tibio-tarsus from moa-hunter midden, Marfell Beach, Lake Grassmere. Coll: J. and R. Britton, 1954.
AV 14249: Part L. tibio-tarsus from moa-hunter midden, Wairau Bar, Marlborough. Coll: E. R. Eyles, c.1945.
AV 11007: Mandible, same data.
AV 1963: R. humerus from Maori settlement site, Te Hiku o te Waeroa, South Bay, Kaikoura, Marlborough. Coll: Canterbury Mus. Arch. Soc., 1963. (Probably the most recent bone, dated later than A.D. 1500.)

Appendix II. Specimens of *Mergus australis* in world museums.

Canterbury Museum, Christchurch, New Zealand.
Skin AV 1580 ♀ May 1894. Sir Walter Buller coll. (Probably the one mentioned in Buller (1905).)
Skin AV 1581 duckling 1891. (Probably taken by a crew member of N.Z.G.S. *Hinemoa* about 14th or 15th Jan. 1890 in Carnley Harbour from a cove in Adam's Island. Culmen 19.5 mm., tarsus 23 mm., mid-toe 28 mm., wing approx. 30 mm. Thought by Buller (1892) to be 7-10 days old. (Chapman 1891; Buller 1905).)
Skin AV 1583 Adult, no other data. (Wing 200 mm., culmen 61 mm., tarsus 44 mm., therefore a male. Toes missing. Shot 30th Oct. 1891 by R. A. Wilson (1959) either in Carnley Harbour (= Adams Island) or Waterfall Inlet. Given to E. F. Stead, and by him to Canterbury Museum on 14th Sept. 1920.)
Skin AV 2944 ♂ Jan. 1901. Earl of Ranfurly coll.
Bones AV 5716 pelvis, sternum and 3 caudal vertebrae ♂ Jan. 1901. Earl of Ranfurly coll. (Probably from Skin AV 2944.)
Bones AV 1582 part cranium, premaxilla, mandible and quadrate, no data.
Bones AV 7157 L. scapula and L. coracoid. (Labelled 'merganser', apparently by Hutton.)
Dominion Museum, Wellington, New Zealand.
Skin (mounted) DM 1357 June 1902. (The date is somewhat suspect since Buller in 1892 and again in 1896 and 1905 mentioned the 'good specimen in the Colonial Museum'. Wing 181 mm., culmen 54.2 mm., tarsus 44.5 mm., tail 75 mm. and toe 58.5 mm., therefore probably a female.)
Otago Museum, Dunedin, New Zealand.
Skin (mounted) A51.50 ♀ 1890. F. R. Chapman coll. (A specimen fully described in Buller (1905). Possibly collected in Jan. 1890, as were the ducklings, although Chapman (1891) stated that their mother escaped. Indeed, as the bird has almost no crest and a short tail, it seems to be a juvenile. Culmen 55 mm., wing approx. 177 mm., tail 69 mm., tarsus approx. 38 mm., mid-toe 56 mm.)

Spirit specimens A51.51 two ducklings 1890. F. R. Chapman coll. (Presumably siblings of AV 1581 in Canterbury and 744347 in New York (Chapman 1891).)

Otago Museum was also presented with a female specimen shot on 30th Oct. 1891 (R. A. Wilson 1959). This skin apparently no longer exists unless A51.50 is incorrectly attributed.

British Museum, London, England.

Skin 1875.11.6.14 Dec. 1874. Baron von Hügel pres. (Taken during the latter end of November 1874 by a man from (?) Invercargill. It is said to be a female and the mate of the bird in the Cambridge Museum (Hügel 1875; Sclater 1881; Buller 1888; Salvadori 1895). However, Dr. R. A. Falla thinks that on plumage characters and dimensions (wing 185 mm., culmen 57 mm.) it is a male.)

Skin 1901.21.57 ♀ 4th Jan. 1901 McLellands Inlet, Auckland Islands, Capt. Hutton coll. Earl of Ranfurly pres. (Ranfurly, unpub.; Ogilvie-Grant 1901, 1905). The date was probably 5th Jan., and the Inlet should be McLennan. Again Dr. Falla has noted the bird, wing 183 mm., culmen 61 mm., as a male.)

Skin 1901.21.58. All details as for 1901.21.57 above. (Wing 180 mm., culmen 55 mm., therefore female.)

Skin 1902.8.6.1 ♂ Lt. Kennett Dixon, R.N. pres. (Lt. Dixon was on board H.M.S. *Archer* which visited the Aucklands in July 1901 (Ogilvie-Grant 1905).)

Skin 1904.4.30.1 Lt. A. F. Stewart, R.N. pres. No other data. (Culmen 55.7 mm., therefore female but, according to Dr. Falla, has indeterminate plumage and could be young.)

Skin 1904.8.4.1 ♀ 9th July 1901 Carnley Harbour, Auckland Islands. Earl of Ranfurly pres. (The collector was apparently Commander J. P. Rolleston of H.M.S. *Archer* (Ogilvie-Grant 1905).)

Skeleton 1904.8.4.2 ♀ 9th July 1901 Carnley Harbour. Part of lower jaw missing. From skin 1904.8.4.1 above (Ogilvie-Grant 1905).

Skeleton 1904.8.4.3 ♂ Earl of Ranfurly pres. Part of legs missing. Trachea and bulla present. ((Ranfurly unpub.; Ogilvie-Grant 1905; Humphrey 1955). Probably shot on 9th Jan. 1902 near Carnley Harbour. A note says 'belongs to standing mounted specimen'; the skin has not been traced.)

Skeleton 1904.8.4.4 ♀ Earl of Ranfurly pres. Complete skeleton, neck vertebrae slightly shot. (Probably shot with 1904.8.4.3 above. A note says 'belongs to lying mounted specimen'; again the skin has not been traced, and no museum claims to have a lying mount.)

Carcass, skinned ♂. (A note states 'belongs to the one standing on the upright. Tibia and tarsus left in the stuffed specimen'.)

University Museum, Cambridge, England.

Skin Dec. 1874 Baron von Hügel pres. (Hügel 1875; Sclater 1881; Buller 1888). (Actually shot in Nov. 1874, male, the mate of 1875.11.6.14 in the British Museum; wing 193 mm., culmen 60 mm.)

Carnegie Museum, Pittsburgh, U.S.A.

Skin 24509 ♂ 1894. (This was purchased in 1905 with the 'Third Buller Collection', and is thought to be the adult male mentioned in Buller (1905). If so, it is probably the mate of AV 1580 at Christchurch. A separate tag bears Buller's no. 125.)

American Museum of Natural History, New York, U.S.A.

Skin 734364 ♂ no other data. (Original label in handwriting of the commercial collector Dannefaerd. (Buller 1905).)

Skin 734365 ♀ no other data. (Dannefaerd's label says 2/1895. (Buller 1905).)

Skin 734366 ♀ no other data. (Dannefaerd's label again says 2/1895. A note by R. A. Falla 5.8.66 says 'This is clearly a ♂'. (Buller 1905).)

Skin 734367 Dec. 1901 Travers coll. (Wing 192 mm., according to Dr. Falla, therefore a male.)

Skin 744347 duckling. (Presumably a sibling of AV 1581 in Canterbury and 151.51 in Otago (Chapman 1891; Phillips 1926).)

All these skins came from the 'Second Buller Collection' via the Rothschild Collection at Tring and according to Salvadori (1895) a male and female at Tring were immature birds in first plumage. Rothschild (1907) mentioned four specimens at Tring, one mounted and three skins.

Museum National d'Histoire Naturelle, Paris, France.

Skin (mounted) 360/1841 ♂ M. Jacquinot coll. (The type specimen, taken during the voyage of the *Astrolabe*, in March 1840 (Hombron and Jacquinot 1841, 1853; Gray 1844-45; Jouanin 1962).)

Naturhistorisches Museum, Vienna, Austria.

Skin ♂ 26th Jan. 1888 A. Reischek coll.

Skin ♀ 26th Jan. 1888 A. Reischek coll. (Possibly from Waterfall Inlet (Reischek 1889; Sassi 1940, 1947).)

Staatliches Museum für Tierkunde, Dresden, D.D.R.

Skin C 5730 ♂ 1874 Wing 190 mm., Carnley Harbour, H. Krone bought and pres.

Skin C 5731 ♀ 1874 Wing 185 mm., Carnley Harbour, H. Krone bought and pres.

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