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ON RECENT CHANGES

IN THE

FAUNA OF NEW ZEALAND.

FROM A PAPER READ BEFORE THE PHILOSOPHICAL
INSTITUTE OF CANTERBURY,

DECEMBER 12, 1872.

BY

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Reprinted from "The Field."

CHRISTCHURCH :

PRINTED AT THE "TIMES" OFFICE, GLOUCESTER STREET.
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RECENT CHANGES IN THE FAUNA OF NEW ZEALAND.

The following are a series of very interesting papers on the above subject reprinted from *The Field*. These papers are by Mr T. H. Potts, F.L.S., of Governor's Bay, and they will repay careful perusal :—

In all observations on the *feræ naturæ* of New Zealand an important fact constantly presents itself, namely, that, in a comparatively short space of time, a marked change has been effected in the fauna through the agency of civilisation.

In a great measure this has been brought about by the increasing destruction of many native species, which are now in consequence fast dying out. At the same time, if, through the indifference of an increasing population or a mistaken zeal in enriching museums, many peculiar and interesting forms are becoming extinct, the introduction of foreign birds by private individuals and acclimatisation societies has added several new species to the New Zealand fauna, which it may be hoped are of sufficient value to render their importation a benefit to the country.

The introduction of foreign birds is attended not only with expense, but with considerable difficulty, and many attempts have failed simply from the length of the voyage and want of proper care and attention on board ship. Yet, notwithstanding these drawbacks, several successful importations have gradually produced effect, and the imported species have multiplied so rapidly that the character of the avifauna in parts has been considerably affected thereby.

In the North Island the common pheasant and Californian quail have increased wonderfully, and are still spreading over a large extent of country; and it is satisfactory to find that the Macris, instead of destroying encourage and protect these new comers. Starlings, sparrows, and finches have in many parts established themselves about the culti-

vated districts and homesteads; while in the province of Nelson especially, acclimatisation has been in many cases most successful.

There the skylark, which in point of song generally ranks next to the nightingale, is becoming quite common. For miles along the road from Nelson to Christchurch it soars and sings as in England.

Upon the well-known sheep walks of the Cheviot Hills many imported birds may be noticed, amongst others the partridge, black-bird, and thrush. Although in most other districts nothing of a satisfactory nature can be reported of the reproduction of the black-bird and thrush, notwithstanding the large number turned out, an instance may be cited to show how well other imported species have thriven and increased. In October, 1863, a pair of greenfinches were liberated, which had been purchased by auction for five guineas. The sole occupant of their first nest was one callow nestling; but before the warm days of summer had quite passed away, a second family of five was reared, and in the succeeding winter a flock of eight was seen daily. In the following year, late in autumn, more than twenty were flushed from a little patch of chickweed, and since then they have spread so far and wide that the greenfinch's note is now a well-known sound.

The musical whoop of the black swan is sometimes heard as the wedge-shaped flock passes over. This grand addition to our list of birds was introduced to clear the Avon from the pest of watercress, which in a few years had grown into such thick masses as to impede the stream. No doubt they cleared a wider pathway for the current, and for a while seemed happy and contented; but gradually they stole away to find more secluded quarters, and were only heard of now and then as appearing on distant lakes and tarns. Less than twenty pairs were liberated

by the Christchurch municipality, and yet they are now represented by many hundreds; as many as five hundred having been counted within a very small area on the Halswell. In Otago, Marlborough, and Nelson they are to be met with in many localities in goodly numbers, for they occupy lakes, rivers, and standing pools quite regardless of provincial boundaries.

In the towns of Kaiapoi and Christchurch flocks of pert sparrows are as busy on the roads as in any English village; the change of climate has not abashed the impudent cock sparrow, nor weakened the hereditary attachment of the species for man's society. Pledges of this friendship are sometimes discovered in wet weather by finding gutters or waterspouts choked up by their warm but untidy nests. The blue gum tree (*Eucalyptus*) affords plenty of shelter, and is found to be a favourite nesting place. The pink-pink of the spruce chaffinch is now constantly heard about our gardens; to these also does the hedge sparrow flit, to hide away her blue-green eggs. How many pleasant memories of home are recalled by the cawing of rooks—the old familiar sounds that woke into drowsy life the vicarage elms and the long avenue that led to the squire's hall.

In Otago, where the introduction of small birds has been managed with much forethought and care, acclimatisation has been very successful; in all probability the southern portion of the Middle Island will rival the northern part of New Zealand in the number of its game birds.

It may be readily seen how our bird system is affected by importations, but we have no clue to the extent of the changes which the next few years may present. The various species which have been mentioned may be now fairly considered as established, and, although the list might have been swelled with the names of many other birds which are supposed to be thriving because they have been turned out or have escaped, we cannot speak of them with such certainty. This country offers such a field for the work of acclimatisation that it has ever appeared to us a subject for regret that efforts of this character are not undertaken on some general plan for the whole country; we might then perhaps have some guarantee that the species imported are worth turning out, and that when set at large their liberation would be effected in places likely to secure them plenty of food and shelter.

If freshly landed birds, with their wing feathers out, weak from a lengthened voyage,

be turned out in such miserable plight in the precincts of a town, it requires no conjuror to foretell the result. These birds would have but a sorry chance of living, and cats would fare daintily; yet this has been done in the name of acclimatisation.

Every rural settler must have observed that our native *Anatidæ* form an important group in the fauna, a fact sufficiently suggestive of the wisdom of adding more birds of the duck tribe. Where nature tells us we must succeed should we be neglectful or indifferent? Nor should it be forgotten that some of the native species are nearly related to birds of the highest culinary excellence. From our intercourse with Australia, America, and Europe, without serious difficulty we might obtain waterfowl of the choicest kinds, which would ultimately prove of great value. The success which has everywhere attended our introduction of the pheasant and quail encourages the belief that further valuable acquisitions to the fauna might be obtained from the great food-supplying families *Phasianidæ* and *Tetraonidæ*, and much of the food of these birds would be drawn from sources which would not be otherwise economised.

After this brief review of changes in our fauna now taking place from the introduction of foreign birds, the effects of colonisation on the habits of those species which we know as indigenous should likewise be carefully considered. The wide-spread cultivation of the soil, the introduction of many foreign fruits and plants, the reproduction of domestic animals, by the European colonist, have each in turn influenced the habits of certain of our birds.

Our falcons have been persecuted so persistently that their race has been greatly weakened in numbers. Unfortunately for them, their extraordinary courage has not yet been tempered with discretion; a bold dash is now and then made amongst poultry and pigeons; but these predatory attacks, intermittent and uncertain, have not influenced their food-acquiring habits in any marked degree. To the more wary barrier, with its greater indifference as to the quality of its food, its grosser appetite, colonisation has added much to its means of living; from swamps and lagoons frequented by ducks and rails, it has been tempted to visit sheep farms in great numbers. It feeds greedily on carcasses or offal; it may be observed also lightly soaring over rabbit warrens, and an examination of its castings discloses the help it lends in checking the too rapid increase of a most prolific rodent. Owls should be

cherished as amongst the number of our best friends; we have found many specimens of its pellets wholly composed of the fur and bones of mice. The cry of the "more pork" at the barn and rickyard should be hailed by the farmer as the greeting of a welcome guest; the wanto destruction of an owl is a public robbery, which should be punished with as much severity as she p stealing.

Halcyons have sensibly increased in numbers as cultivation has spread; they are true allies of the gardener and farmer, and clear off hosts of insects that infest or devour the produce of agricultural labour. These birds follow closely in the wake of the settler, and may be termed common where they were a few years since considered rare; last breeding season they were found sixty miles at least inland. The clear-voiced bell-bird affects orchards and gardens where fruits and flowers abound, and assists in propagating several species of berry-bearing shrubs. The garden likewise has become the shelter and the feeding ground of the omnivorous Zosterops, which may be looked upon as the most successful of self-invited colonists. The tiny wren (*Acanthisitta*) reproduces its kind amongst the improvements and amidst the bustle of the woodland homestead; its nest has more than once been found in the mortice hole of a stockyard post. Its appetite has become depraved to a certain extent perhaps by its close acquaintance with the pakeha, as dead bodies of this pretty little species of creeper have been found in hog-tubs—the floating particles of fat had been the tempting but fatal lure. The grey warbler (*Gerygone*) is now a constant inhabitant of the garden (it has learnt to supplement moss, lichens, spiders'-webs, and other nesting materials with threads of cotton or worsted wool, &c.), and suspends its cleverly-constructed home from the hanging sprays of the blue gum (*Eucalyptus*), or fixes it within the sheltering hedge of gorse (*Ulex*); this habit affects the domestic economy of the cuckoos, for both *Eudynamis* and *Chrysococcyx* makes use of this warbler as a dupe. Last summer instances occurred of both these migrants being reared in gardens in and around the town of Christchurch; and the whistling cuckoo *Chrysococcyx* was more abundant there than usual. The tit (*Petroica*) haunts gardens and watches the labourer upturning the soil with all the confidence that is displayed by the red breast at home. The brown creeper (*Cerchiparus*) visits the meat gallows of the stations, for the sake of picking off morsels of fat, and is often associated when so employed with the noisy

parakeet. The latter species takes tribute from the cornfield and fruit garden when an adjacent bush affords it a refuge. Flycatchers (*Rhipidura*) of two species frequent sheds and houses, in the autumn especially, finding abundance of food in the minute insects that infest man's habitations; this habit we noticed after the domestication of the house fly, said to be introduced here by the cattle ships from Australia. The raptorial habits developed in the kea (*Nestor*) in certain Alpine districts is an interesting and peculiar incident in bird history. The omnivorous woodhen, which shows so strong an inclination to avail itself of the advantages of the settler's improvements, is too mischievous to be tolerated; the farmers' dogs act as police to restrain or deter from pilfering this Arab of the bush. The pukeko, or purple gallinule (*Porphyrio*), and the paradise duck of New Zealand sheldrake (*Casarca*) are not esteemed as friends by the farmer, who begrudges them the tender grass or growing grain which attracts them to his land. The gulls (*Laridae*) which follow the labours of the ploughman with beneficent industry, have lately discovered a fresh and abundant food supply. Since the establishment of meat-preserving and boiling-down factories in certain spots, these birds may be observed collected together in thousands, feeding on the refuse which has been carted away from these great butcheries.

The common tern (*S. antarctica*) constantly follows the newly turned furrow, and greatly benefits the agriculturist by its persevering search for larvae and other insect food.

It may be gathered from these remarks how many species of native birds seem to be natural allies of man in checking the undue increase of that which is hurtful to his interests, and which in such a climate might become a plague but for their interference and assistance.

Acclimatisation, which is effecting daily changes in our bird system when successful, constantly records the history of its progress with the music of fresh notes and calls resounding from shrubberies and plantations. The sounds of our native vocalists are not less worthy of attention. With diffidence I propose to offer some observations on the vocal characteristics of our birds, and note their love songs, alarms, notes of warning or defiance, together with some of the various and peculiar cries to which gregarious birds give utterance.

To those familiar with the wilds of nature, much of the real history of bird-life is dis-

closed by their notes; for instance if the voice of the halcyon were heard from the first day of August to the month of January (the breeding season), it would not be necessary to see the bird in order to form a tolerably correct idea of the nature of its employment.

Bird-sounds, as received by the ear, it is impossible to reduce to writing, nor do I believe it will be achieved till science shall have instructed us by some method to render in intelligible language the many fleeting forms and figures which the Babel tongues of sound impress on the wavelets of the surrounding air. Formidable discovery! Then we shall hold as a priceless truth that, if speech is silver, silence is golden!

But although it seems impossible to write down bird-sounds, yet a notion of their effect on the air-waves might be hazarded. For the purpose of explanation, let us suppose the existence of an undisturbed mass of air; could not the figures described therein by the calls of various birds be idealised into forms, and a symbolic rendering of the sounds of bird-language be produced?

As illustrating the meaning in view, let us suppose that the sharp jarring scream of the falcon would be represented by a figure somewhat like a barbed lance; the call of the cuckoo (*Chrysococcyx*) would be pictured in gently sweeping curves; whilst an acute angle would typify the scream of the weka (*Ocydromus*).

From the notes and observations I have made, I have no doubt that birds breed here in every month of the year; and according to generally accepted opinion, therefore, we ought not at any time to lose the music of the woods. But there are active agencies at work which are quickly rendering whole districts comparatively mute, and these will be presently touched upon.

At night we hear the sounds of birds high up in the air, as flock after flock seek the coast or the brackish waters of the shallow mere. These notes are probably, as Gilbert White said, a safe-guard against dispersion in the dark, or may convey some intimation of any change in the order of flight; they are usually briefly yet deliberately sounded. Sea fowl are far from silent when on their course, ascending rivers or roaming above the harbours and bays that indent the shore.

Living close to the beach in a sheltered nook in Port Cooper, at no great distance from the extensive area of Lake Ellesmere, it may be that I have been more than usually attentive to these wandering voices, since few woodland birds now frequent the slopes

of our picturesque hills, like many other districts once clothed with stately trees and bright-leaved shrubs. Shade and shelter gone, bare stems with whitened tops remain, and point to the work of the ruthless bushman.

Often at night, about the second week in January, the shrill piping of the oyster-catcher (*Hematopus*) is heard, and, soon after, the yelping cry of the stilt (*Himantopus*) apparently from a great height. These waders are amongst the earliest to quit their inland breeding haunts and bring their pied broods towards the coast. They are on their way to join or assist in forming the large flocks which during the autumn and winter, spread themselves along the shores and over the flats and harbours, where abundance of food can be procured.

Many genera that must in all fairness be termed gregarious utter their calls and cries with frequent repetitions, and that, too, in broad daylight. Can we divine their meaning? Let us observe which are the noisy species. Flocks of terns may be heard screaming at some distance, as in open order and at no great height they stream across the country, foraging by sight. Is their squealing cry uttered in rivalry, for companionship, for encouragement, or satisfaction at the prospect of a well filled gullet? Watch a flock of the same species hovering over a river, and should anything unusual—such as a dead bird—be borne down with the current, a clamour at once arises. How swiftly is the news spread from bird to bird! In a brief space hundreds are wheeling and screaming over the object of attraction. In this case the call conveys intelligence; it is analogous to the bushman's "coo-ey," attracting instant attention, and summoning the presence of all within reach of its sound. In the instances given the call notes used appear very similar. By way of contrast, stroll across one of their breeding grounds when the down-clad young lie in couples without the slightest shelter. Fiercely is the intruder assailed; the harsh scream becomes intensified, and plainly expresses anger, defiance, and would-be intimidation, for the brave little tern protects its nestlings, even against man, with a courage unknown to the more powerful gull. Our large gull (*Larus dominicanus*) will drive away the egg-stealing harrier, which soars aloft in wide circles on silent wing as the gull chases it from the neighbourhood of the sandy shore or rocky cliff where the roughly-built nest protects the brown-blotched eggs; it marks each dashing stroke with a short bark

of anger, and returns from the pursuit with hoarse, gratulatory noise. But when man assails its treasures the miserable bird wheels aloft, and, circling round in company with its neighbours, breaks forth into loud despairing cries that sound like thick-voiced, mocking laughter. There is no *levée en masse* as with the plucky terns; there is no attempt made to defy or inspire fear; but, securing itself from danger by ascending in wide circles, the loud-voiced sea-fowl looks down on the plunderer in timid helplessness, uttering incessantly its wailing lamentations. Look at that flock of gulls which surround the shipping lying at anchor near the break-water! What a busy picture of noisy activity! It is life at high pressure, and stands out in bold relief to the rest of the scene, where all around lies still and silent, steeped in the full glare of noon. Some are ranging restlessly in circles, and swiftly then shadows come and go upon the glancing waters; others sit lightly and gracefully on the rising swell—all on the look-out for scraps that may be thrown overboard or swept through the scuppers of the ships. Suddenly one quick-eyed bird pauses in his flight, hovers an instant, from beneath the snowy tail feathers drawing his pink feet, which for a brief space dangle in ungainly fashion ere they clutch the water; now he has snatched some bulky morsel. What a vociferous outcry, as half-choked he strives to gulp it down! His wings, not yet close folded, he spreads again for flight. Attacked on all sides by his clamorous fellows, he drops the envied lump, and instantly joins the common flock in chase of the lucky bully that has swept off the prize. Then pursued now becomes the pursuer, and this continues until some widely-distended throat at length entombs the object of this fierce contention. Here the birds among themselves, without man's interference, show an amount of boldness that appears remarkable; the air resounds with their sonorous cries. Seldom if ever is the hunted bird struck by his companions; he yields his prey from fear, or drops it in the attempt to obtain a fresh hold and by another catch place it more easily for swallowing. If lost from fear, can it be from dread of the menacing blow that seldom if ever descends? has it not instinct enough to appreciate the threatened attack at its true value, judging from its own harmless bullying?

On the mud flats at the head of the harbour, patched here and there with a dwarf growth of *zostera* and banks of time-bleached shells,

as the tide ebbs, flocks of godwits (*Limosa Novæ Zelandiæ*), arrive and probe the yielding surface with their long bills; their call cannot be distinguished from that of their European congener, although now and then a yelping sound is emitted without any apparent cause, unless it be a note of satisfaction, for they feed silently. Noisier, and far shriller in their notes, are the oyster-catchers, which feed in company, wade in the shallow water, or course along the margin with swift-plashing run. When the pied stilts feed in numbers by the shores of Lake Ellesmere, their notes are constantly repeated, sounding not unlike the barking of young dogs, whilst the oyster catcher's shrill note rather resembles the running down of an alarm in the rapidity with which the sound is repeated.

The call of the paradise duck (*Casarca*) is often heard in lofty flight, bringing to mind the notes of the wild geese at home. Some fancy they can detect in the hoarse call of the paradise drake the words "Hook it, hook it," as a hint to escape, whilst the shriller cry of the duck inquiringly replies, "Where, where?"

Amongst other species which use the voice in company and seem to enjoy the chorus, the lark may be mentioned, as it usually utters its sharp "chirrup," "chirrup," on taking wing. The same note, or one vastly like it, is used for encouragement or to incite watchfulness when a flock in loose order are near a harrier hawking close to the ground, or perched on some commanding stone or tree. When the blight birds (*Zosterops*)—which might safely adopt as a motto "*Fruges consumere nati*"—crowd about a tree, peering through the leaves, thrusting their sharp beaks into the fresh pulp of luscious plums, they constantly twitter, as they also do when shifting to fresh food; the call note, not unlike the chirrup of the sparrow, is always quickly answered. Their power of song as yet does not seem to be appreciated as it deserves. I have heard individuals sing their sweet low notes in a way that would charm the most exacting bird-fancier that ever gathered chickweed. The notes of the bell-bird, as it trips up and down the scale with a cough at the end, are too well known to need further notice; one of their concerts, with a full chorus, is a delightful treat that sometimes rewards the early riser. The graceful parrakeet utters a gratulatory note as the flock hastily assembles to some favourite food, as on the stooks of an oat field; this differs from their call when on the wing, as much as it does from that low confidential murmur in

which I have heard a pair indulge about nesting time. The kaka in his leafy domain utters his harsh grunt of satisfaction as he and his mates scramble about the bending boughs that yield a honeyed food. How shall I attempt to describe the song of the tui, with its sudden bursts of melody, ringing the changes upon notes merry, plaintive, or harsh, in rapid sequence, as though the sympathetic voice felt and expressed every varying emotion that chanced to stir the lively bird? The attitudes assumed during the course of its recitative are well worth watching, although they may seem to detract somewhat from the pleasure of hearing it.

The kaka sounds his alarm harshly, hopping restlessly from bough to bough; nor does his warning cease whilst on the wing, gliding to safer quarters. In the moist *Fagus* forests, where glades are carpeted with the deepest moss, the beautiful green wren sounds his cheery cry, denoting danger, with a most confident air. Away out on the open ground or sandy river bed, how often does the "twit, twit," of the banded dotterel, or the sharply uttered "ti-winkle, ti-winkle" of the redbill or oyster-catcher, help to moderate the weight of the sportsman's bag; the paradise drake lifts his head, sounds his "kownke," from a fast walk he hastens to a run, and at length sails away with his shriller-voiced mate.

Very noticeable is the faculty which birds possess of hushing their young to silence, and of bidding them hide at a moment's warning, perhaps by the sound of a single note. Amongst some species of waders this obedience to parental guidance is most observable; young stilts, plovers, or redbills, that have been rambling over their feeding ground, at the sound of alarm suddenly seek cover, and only after the most careful scrutiny may be found lying *perdu* behind some sheltering stone. Perhaps the most monotonous amongst all the calls of our young birds is that of the large gull (*L. dominicanus*). When nearly fully grown—about the months of April and May—it follows the old bird with untiring perseverance, clamouring for food with a long squealing cry. I have heard it on the beach whilst it has been wheeling round and round to reach its parent's bill in hopes of a supply till the sound has become quite tiresome to listen to. By way of contrast to the patience of the old gull, it may be noted that the young of the Petroica when well grown, as it is by December, is driven off by both parents with something like harshness both of tone and gesture. The fierceness which is displayed by the common tern (*S. antarctica*) in defence

of its young has been already noticed; a similar degree of courage is met with in the case of the falcons and the little grey warbler (*Gerygone flaviventris*). On nearing a taratah (*Pittosporum eugenioides*), where some young warblers were perched, the old birds commenced a furious attack, darting close to the face, precisely after the manner of the common tern, and, allowing for size and power, uttering a similar jarring scream to that bold bird. With the falcons the utmost perseverance is exhibited in driving away a foe. In December last, up the gorge of the Lawrence, a pair of bush hawks (*Falco ferox*) assailed one of my sons and myself for a space of two hours whilst in the neighbourhood of their young; then the usual swiftly-uttered "kli, kli, kli, kli" was even more rapidly sounded, whilst its tones were savage and threatening. The young at the time we are able to fly some little distance, yet only one moved once, that we could observe, from the instant the note of alarm was given. The bronzed-winged cuckoo or whistler (*Chrysococcyx*) always makes known his presence with an oft-repeated whistle; the long-tailed kōkōes announces his arrival with deep-breathed note; these love calls are unlike all others of our bird-sounds. The wild scream of the weka-rail tells us of his whereabouts from a considerable distance; and this most confident of rails is as noisy by night as it is by day. When sitting still in the bush I have seen a weka silently approach and give notice of my presence by a strange note, which, although delivered within a few feet of where I was sitting, sounded like wood being struck at a great distance off.

The remarkable notes of the owls must not be passed over silently; for the name at least, if not the appearance, of the morepork (*Athene Novæ-Zelandiæ*) is well known throughout the colony. Australian settlers distinguish a podargus by a similar name, whence the colonial epithet (whether of New Zealand or Australian origin is uncertain) applied to a dawdling person, who is often described as "a regular old morepork." The call of the wekau (*A. albifacies*) is vociferous, wild, often startling from their heavy slumbers the inmates of the mountain huts. Probably the clamour of this genus, like that of *Falco*, is a means of startling some of their prey into motion. The large owl is said to have likewise a call somewhat similar to the morepork, but much more gruff in tone. Laughing-jackass is one of the names conferred on the wekau; this distinction is shared by an Australian bird as well as by

some of our seabirds amongst the petrels or Procellariidæ.

When the south-east wind blows on our east coast, bringing with it thick hazy weather—when curling mists drift up the harbours and hide away in their vaporous mantles hill and mountain, shearing the landscape of its fair proportions—the curious note of a petrel may be heard from dusky eve till early morn, not only about the harbours and estuaries, but far up the river beds to the gorges in the vast mountain chain of the southern Alps.

Amongst the most silent of our birds may be named the shags (Pelecanidæ), the harrier, the heron, and the grebe, whose voices, except during the breeding season, are rarely heard. The squeal of the harrier is most infrequent, considering what a very common bird it is. In the breeding season the scream is heard from a bird soaring high in air, or frightened from its nest, or suddenly driven off its prey occasionally only from a bird on the wing hawking over burnt ground which has disclosed perhaps an unusual abundance of lizards. The cries of birds in several cases appear to be more or less dependent upon atmospheric changes. At such times gulls become vociferous, restless, soaring aloft with rapid unsteady course, and wekas are very noisy; on the other hand, many species are silenced altogether by bad weather. The thrush, of many notes, utters some so like those of other birds as to become rather puzzling should one try to fix on the unseen performer. The flute-like mellow pipe of the wattle bird (*Callæas*) is unrivalled for its sweetness. The little creeper (*Acanthisitta*) never moves without emitting its tiny twitter. The kingfisher is generally silent except during the breeding season, or its note is used to intimidate, either when attempting to seize a post already occupied by one of its kind or when defending its position from an attempted intrusion; thus our halcyon differs in habit from the kingfisher of the old country, which is said to utter its cry whenever it takes wing. Notwithstanding the gush of song which in summer-tide salutes the cool dawn before the rosy hues have fired the eastern sky, many of our lute melodists retire late to rest, such as *Anthornis*, *Petroica*, *Gerygone*, and *Zosterops*, and their lingering notes may be heard long after sundown. Often is observation made upon the readiness with which some species of our native birds learn to imitate the human voice, an accomplishment which is always popular; yet, as an exhibition, the result of long practice and frequent repetitions, I am

inclined to place it in the same category as a man's imitation of the crowing of a cock (I have known a grave senator mimic "the cock's shrill clarion" well enough to threaten the harmony of a farmyard). Some persecuting enthusiasts find that the kaka, parakeet, and tui are the most apt to acquire this power of uttering sounds that bear a fancied resemblance to words.

In the foregoing notes the voice of the large gull has been more than once mentioned. On the mudflats or sandbanks, when a small flock of five or six of these birds are met together, after a few deep-toned barks or growls they hold a regular "tangi," and utter most dismal wails or yells, or what seems like a dialogue or discussion takes place, very often received by the auditory with mild barks that might well pass for applause or "loud and continued cheers." This habit, not confined to the large gull, is also possessed by the smaller species, *tara-punga*, although the latter is less noisy. The terns, too, meet in parliament on the shore; and a solemn conclave of oystercatchers may sometimes be noticed standing in unusual repose, at intervals only uttering a shrill pipe, and this when close at hand the godwits are working in their tripod fashion to extract a dainty morsel from the ooze.

Attention has already been directed to the fact that in the alpine districts of New Zealand the notes of the birds are pitched in a higher and richer tone than in the valley, and in some of the most elevated woods which the bell-bird frequents we have found the note or brief song of the hen bird especially delightful. Whence this result? Is it due to the effects of inspiring the keen mountain air? to the quality of its food being climatically altered? If we notice some of the fruits and berries from which it derives some portion of its support, we shall find that the black berries of *Aristotelia racemosa* are represented in the alpine fastnesses by those of *A. fruticosa*, the pulpy fruit of *Coriaria ruscifolia* by that of *C. thymifolia* and *C. angustissima*, whilst the drupes of *Coprosma lucida* and those of many other species have their mountain representatives in *C. cuneata*, *C. acerosa*, *C. linariifolia*, and others. Will the chemist tell us, from analysing these fruits, that this change is enough to cause some modification in the muscular apparatus that modulates the tones issuing from the larynx? The scientific ornithologist would admit no specific difference after inspecting a score of skins; for length of feathers, colour of plumage, point out the bird as *melanura*.

As to the reason for the bell-bird's song

being pitched in a higher key, it may perhaps be found in the fact that thick mists often envelope the mountain's side; that the bushes in the more elevated gullies are much scattered, small, and isolated. Hence the alpine note is fitted to meet the peculiar physical conditions of certain localities, by enabling the sexes to communicate with each other when collecting food at some distance apart.

The power of imparting intelligence, as exercised by birds, must be obvious to anyone who is acquainted with the ordinary inmates of a poultry yard. In many feral species that have come under observation this faculty is quite as conspicuous as it is amongst many domesticated *protégés*. Last summer, for the first time, a few tuis appeared amongst the cherry trees in a garden up the gorge of the Ashburton, miles away from any bush frequented by the tui; for the first time cherries were tasted, the knowledge of their excellence was communicated, and the trees stripped by the industrious tuis. Not a month afterwards, when slowly sailing up the harbour, one of the children threw a piece of bread to a young gull (*L. dominicanus*), the only bird in sight. Its bark of pleasure brought others till then unseen, and the wake of our boat was enlivened by an irregular train of noisy attendants. Those species which do not launch lightly in the air when taking flight, we believe may be ranked among the more silent birds, as, for instance, the cormorants; birds of this genus seem to need a fulcrum in order to rise upon the wing. The fleet halcyon, too, when its perch is a bough, and it leaves it to dash at its prey, the bough may be seen to vibrate for some time after it has been quitted. Both of these genera may be fairly classed with the non-vociferous tribes, notwithstanding that the halcyon indulges in a variety of expressive notes during the breeding season.

I now leave with regret the interesting study of bird sounds, and trust that others will prosecute further observations; for there is much to be learnt by the field naturalist about their notes and calls, which would assist in revealing many interesting points in the history of the fauna. In conclusion, let a few words be recorded for the preservation of our native fauna. It is a work of difficulty, except with a few, to get folks interested in this subject; amidst the busy swarm of men pressing onward in the struggle for wealth or position, how few out of the entire mass would think of turning aside, and thus lose a fraction of the time devoted to the toilsome climb of the social ladder. To those who do give thought

to the matter, who consider the changes which the settlement of a country necessarily entails on the physical conditions of that country, rendered evident by local climatic modifications patent to every observer—to those, the task of bird preservation presents a host of difficulties. In the first place, there is that *vis inertiae* to be overcome, that dead weight of inaction, so difficult to move, that lazily finds expression in the sentiment so often uttered, that the disappearance of the native fauna is the natural sequence of Anglo-Saxon colonisation. It is almost needless to observe, the inference is not rendered truer, although it may gain greater credence, by much vain repetition. The most striking, not to say alarming, alterations that have rapidly followed the progress of European settlement in some districts are due to the fact that the conservation of forests is either much disregarded or entirely ignored. With the help of the drying nor'-wester, the grandest fireworks with scenic effects more brilliant and wonderful than the most skilful pyrotechnic display, may be enjoyed by anyone who may happen to possess a few matches. With a box of these useful articles, which are far more effectual than the keenest American axes, national property to the value of many thousands of pounds sterling is annually disposed of. It may be a matter for surprise to foreigners that an amusement so costly to the many should be permitted for the gratification or enrichment of a few, entailing in its results, more or less immediate, the scarcity and enhanced value of timber and fuel, the necessity of irrigation, the erection of works for the conservation of rivers, the absolute loss of rich alluvial land, washed away by floods or swallowed up by hungry sands and single beds. The destructive results of timber burning and disforestation could be swelled into a very long list of evils that follow in its train, some of which are confessedly irremediable; it is sufficient for our purpose to point out one of the most serious obstacles to bird preservation—one of the most active causes which has led to the increasing rarity of many species. These great fires, be it understood, usually take place at the very height and summer of the breeding season. To the naturalist, the mere mention of this fact is enough to show him that birds could not be taken at so great a disadvantage at any other time. Then there yet remain to be sipped by the *Meliphagidæ* nectarine juices, viscid, transparent; insects, developed in their perfect form or less active larval state, are busy on their feeding

ground, about which restless *Certhiidae* creep swiftly, using their searching probe-like tongues. The wealth of spring flowers has passed away, with all their varied beauty and fragrance; the burdened sprays, lately hung round with panicles or corymbs well stored with hidden honey, are now weighted with green drupes or berries, which, swelling with the warm breath of summer, give fair promise of rich harvests in the winter months when, pinched by hunger, the wandering flocks follow the ripened fruits. This is the time when bush fires are recklessly started on their wasteful errand. Driven by the force of furious nor-westers, huge volumes of suffocating smoke invest the bending branches, crisp the parched leaves, and so prepare the forest for the roaring sea of flame that follows; nests, eggs, young birds perish in the general havoc; brooding birds weakened by incubation, and parent birds that hover round their helpless young must fall in numbers; those that escape—refugees on strange, perhaps sparsely furnished feeding grounds—lose their chance of increase for the year; hence the match after all does more execution than the gun, even at a *battue*. When at length we can find leisure to raise our thoughts from to-day to care and act for to-morrow, this state of things will no longer be endured; the commercial element will step in and record its veto against destruction; not from any feeling of sentiment—for commerce, whose only real law is gain, would chaffer away every tree in the country if a margin of profit attended the transaction—but because it will find out that the preservation of forests can be made to pay.

At times it has appeared as if the advisability of fostering and encouraging the reproduction of many useful species of our fauna had taken hold of the minds of the people, and legislative enactments have pointed in that direction; but the advance has been but slow and halting, notwithstanding the encouraging success that has attended the introduction of the present imperfect laws for the protection of animals. It would not be difficult to show that the extension of the schedule of protected species would be beneficial to the colony; we import so called insectivorous birds at a vast outlay, and kill off our own insect eaters in countless numbers.

After paying attention for many years to the habits of our birds, it is confessedly a matter of difficulty to understand what principle has guided the selection of protected species. For instance, we profess to shield those beautiful waders, the stilts, during the

breeding season, and with superfluous care other birds which are not known to exist here; yet on what food do our native *Charadriidae* live, that they should be over-looked. We protect the bittern, whilst the noble-looking kotuku is exposed to the murderous gun at all times in the year; the tui is cared for, whilst the tickle, kiwi, and flocks of other useful birds may be exterminated without a word.

The idea at once suggests itself that the New Zealand Institute might do good work in advocating the protection of such species as, from a knowledge of their habits, it could recommend as being of service to the country. This first step taken, other advantages might accrue from the interposition of the institute. Under its direction a list could be prepared of desiderata of real value, as welcome additions to the fauna or the flora of these remote isles; a list so prepared and recommended could not fail to have some weight with the various acclimatisation societies of the country.

It would not be a matter of much regret if the present irresponsible system of acclimatisation were stopped before mistaken zeal results in further errors. This is a delicate subject to deal with, and I trust it will not be considered impertinent to question the infallible wisdom of acclimatisation councils. The time may come when the antipodean sparrow controversy may be renewed here; when that grand bird, the black swan, useless or unsavoury as food, a disturber of the broods of less powerful *Anatidae*, may be regarded as an acquisition of doubtful value; whilst the country might trust, with something like security, that such an ignorant and expensive blunder as the introduction of the weed *Anacharis alismastrum* would be avoided. Acclimatisation societies might expend some energy in the re-establishment of the most valuable of our native fauna. This would prove a useful if not a very showy occupation; dwellers beyond the narrow confines of our shores would take an interest in the progress of such a work; yet it must be candidly avowed that attempts in the direction indicated would be attended with little of the *eclat* which now accompanies the announcement of every newly introduced wonder and advertises each local society.

Nevertheless, by all means in our power, let us preserve our native birds. Let it not be forgotten that within our narrow boundaries are many very singular forms; that our fauna comprises about a score of indigenous genera, of which not more than two (*Prosthemadera* and *Hymenolaimus*) come under the

Bird Protection Act. These peculiar forms are of very great interest to naturalists and physiologists the wide world over. We shall justly incur the opprobrium of barbarism if we neglect to use strenuous exertions to avert the fate which seems impending over them. No excuse that we could offer for indifference will palliate our destructiveness in the eyes of the scientific world.

In this as in former papers, when attempting to describe the habits of several species, I have thought it desirable to point out the utility of many native birds to the agricul-

turist and the gardener. In fact, the preservation of our birds should enlist not only the attention and co-operation of the man of science or the naturalist; the subject has a just claim on the consideration of the political economist, the farmer, the gardener, the sportsman—not only on the rural settler, but also on the townsman. The sooner this is understood and recognised, the sooner may we expect to see some well-directed steps taken to secure an object of so much interest to the country at large.

