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THE ELEPAIO OF HAWAII.

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THE ELEPAIO, as the natives call the several members of the genus *Chasiempis*, is one of the most beautiful, as it is one of the most interesting, of all Hawaiian birds. Clad in modest but pleasing colors, confiding to a degree, graceful in motion and interesting in habits, it is the best known, as it is one of the most abundant, of the Island species.

In the three islands the bird inhabits, it is widely diffused, frequenting the forest almost down to the sea, where the forest reaches so far, and yet ranging far upwards towards the timber limit. The Elepaio does not migrate from place to place in search of food, but inhabits the same locality year in and year out, being apparently the last bird to forsake a tract of forest when, as often happens, encroachments of any kind have caused its abandonment by other and more sensitive species. Thus sedentary, the bird is more continuously subject to environmental influences than some other Hawaiian birds which move about more or less in search of food, and hence might be expected to differentiate into varietal forms. This, as we shall see later, is the case.

The insular distribution of the Elepaio is peculiar. Few if any of the endemic species would seem to be so well adapted to wide dispersal in the group as this little flycatcher. Its habits are a combination of the wren and flycatcher, the former decidedly predominating. The Elepaio would thus seem to be quite capable of

securing a permanent foothold, and of securing a livelihood, under conditions that might prove fatal to a flycatcher of more specialized habits.

Yet, as a matter of fact, the Elepaio occupies but three islands of the group, viz. Kauai, Oahu and Hawaii, the two oldest and the most northern of the group, and the youngest and the southernmost member. The bird is thus absent on the three middle islands, two of which, at least, are well adapted to its habits. A flight of twenty miles would carry the bird from Hawaii to Maui, and the absence of the bird from this latter island, and from Molokai, is a puzzling and interesting fact in bird distribution.

It is difficult to understand, indeed, how the bird originally reached the island of Hawaii from Oahu, the two islands being about one hundred miles apart, unless by way of the nearer and intermediate islands of Molokai, Lauai and Maui. Upon the other hand it does not seem at all probable that the bird once occupied either, or all three, of the intermediate islands, and either voluntarily abandoned them, or became extinct there.

However if final extinction was known to have followed the bird's occupancy of either one, or all three, of the above islands, it would add but one more instance to the several already known where birds seem to have found their way to, or have originated upon, the islands, to have gained a more or less firm foothold, and then to have perished off the face of the earth from no determinable cause.

That the Hawaii Elepaio is a direct derivative from the Oahu form (*gayi*) rather than from that of Kauai (*sclateri*) is highly probable. Not only is Oahu much nearer to Hawaii, but the Oahu form much more nearly resembles birds from Hawaii than does the form from Kauai. As to which of the two islands, Oahu or Kauai, was first reached by *Chasiempis* from its original home far to the southward, there seems to be no evidence, although, as Kauai is much the older island, it is permissible to infer that the bird's first foothold was there.

From the time when first described down to a comparatively recent period, the members of the genus have been the cause of much confusion to writers. This is due chiefly to the fact that the juvenile plumage differs markedly from the adult dress and,

as the bird breeds in its juvenile and transitional plumages, *i.e.*, before it is a year old, the young and the old more than once have been described as different species.

The writer is not aware that the habit of such precocious breeding is paralleled among American birds of the temperate zone, but it is common enough among Hawaiian birds and, probably, elsewhere in the subtropics and the tropics. Not only do the juveniles of the genus *Chasiempis* breed, mating with each other though perhaps more often with older birds, but the same habit is observable, though perhaps not so commonly, in the genera *Psittirostra*, *Heterorhynchus* and *Phæornis*. In fact it is probable that all Hawaiian birds begin to breed at a rather precocious age as compared with their kind in the temperate zones.

With the knowledge that the juvenile and adult states of *Chasiempis* were *stages* of but one species, and that the change of plumage was uniform in the three members of the genus — first elucidated by Messrs. Palmer, Wilson and Perkins — the chief cause of confusion in the group was eliminated. The sequence of change from the juvenile through the transition stage to the final adult plumage is now pretty well understood, though the length of time necessary to the assumption of the final dress is not yet made out. It also remains to consider the status of the bird found upon the island of Hawaii, which is the main object of the present paper.

The island of Hawaii is divisible roughly into two parts on the basis of its rainfall, much of the windward side having a rainfall of from over 100 to nearly 200 inches a year; while the fall on most of the leeward side runs from 18 to less than 100 inches.

With such marked differences of rainfall, accompanied by corresponding differences of climate and vegetation, the ornithologist, familiar with the results of climatic variation upon American birds, will naturally expect to find similar variation among island species. The effects of lesser rainfall and of climatic changes upon the latter appear, however, to be much less noticeable than might be expected from the above bare statement of the facts.

Moreover they are probably somewhat less apparent to-day than formerly, when the forest extended nearer, though in most parts rarely perhaps, to the sea. For it is in the lowlands that the rain-

fall is comparatively small, is more irregular and varies most widely locally. This shore belt is now, and for many years has been, practically barren of native birds owing to its deforestation, the birds being chiefly confined to the middle and heavily forested region, from 1500 to 4000 feet altitude, where the rainfall and other conditions are more uniform than below.

Moreover, as above stated, several of the species move about in search of food, and although such movements are by no means the equivalent of migration as the term is usually understood, the effect is similar in diminishing, or altogether preventing, the results of continued residence the year round under similar conditions of environment. The islands, too, for the most part are so small, and the local conditions vary so widely, that a bird must be local indeed to permit of geographical variation.

In comparing series of several island species from regions of comparatively small rainfall with others having a maximum amount the difference in depth of coloration, if any, appears to be very slight. Specimens of *Chlorodrepanis virens* from the leeward side of the island seem to average somewhat paler than those from the windward side. The same may prove to be true of *Phaornis obscurus*, though at present the writer has a sufficient series of this species only from the windward side. In neither case, however, do the differences seem to be sufficient for the recognition of geographical races. It is otherwise in the case of the Elepaio.

Of this bird there are two distinct forms the habitats of which seem to conform in the main to regions of greater and lesser rainfall. On the windward side of the island, from just south of the Volcano of Kilauea to the neighborhood of Ookala, a distance of some eighty miles or more (embracing many thousand acres of deep forest) is found the form described by Dr. Stejneger as *C. ridgwayi*, the earlier described *sandwichensis* apparently inhabiting the remainder of the island.

Descriptions of the two forms are given below, but it may be briefly stated that *ridgwayi* is characterized by a rich, dark brown above, almost a chestnut, with chestnut face markings; while *sandwichensis* is of a much lighter brown above, with more white on the tail, and the chestnut face markings are mostly replaced by pure white.

In the deep forests of windward Hawaii the Elepaio is particularly abundant and, in addition to over one hundred specimens in hand, the writer has examined in the course of his field studies probably upwards of a thousand individuals; for the bird is so tame and so curious that it may be called up close to the observer and every marking may be discerned. In all the number that have come under observation, in the field and in the closet, but three individuals have been found from the region above mentioned that show traces of a white loreal stripe indicative of the other form.

Near the above named points however, Ookala on the north and the Volcano on the south, the two forms come together, and here intermediate specimens abound, not a few, indeed, being assignable with difficulty. As it is at these points that the rainfall begins markedly to lessen, the cause of the change from one form to the other, with the presence of intermediate specimens, is obvious enough.

As indicative of the part rainfall, with its accompanying changes, plays in the development of the two forms it may be mentioned that in the region above Kealekekua Bay, Kona on the leeward and dry side of the island, where the rainfall rises to over one hundred inches, perhaps ten percent of the Elepaios were found to be intermediate in coloration, the remainder being of the *sandwichensis* type.

That the chestnut-faced bird is not simply a stage of plumage of the white-faced form is sufficiently attested by the fact that it is the final adult state of all the birds in the extensive region above named, where the white-faced form does not occur at all, and is only indicated in highly exceptional cases.

A word may be added as to the names of the two forms. The description of Gmelin's *sandwichensis* was based upon Latham's 'Sandwich Flycatcher,' and seems to have been that of a young bird, or at least not of an adult, as appears from the non-mention of a white rump, always present in the adult, and the stated yellowish base of the bill, always so in the juvenile bird, never in the adult. The feet of no form of *Chasiempis* are 'black,' but always are blue, lighter blue in the juvenile stage than in the adult.

All things considered, however, it seems better to overlook the shortcomings and inaccuracies of Gmelin's description, and accept

his name, *sandwichensis*, for the white-faced form. Latham's specimens almost certainly came from the region about Kealekekua Bay, if it came from the island of Hawaii at all, as there is a reasonable degree of probability that it did.

Of the applicability of the name *ridgwayi* to the chestnut-faced form there is, of course, not the slightest doubt, although at the time he described the bird Dr. Stejneger appears to have been under the impression that this was the only form upon the island of Hawaii. For this error he is excusable enough, since the author lived more than five years on Hawaii before he saw a specimen of the other form. Indeed it would be possible for a collector to range the forests included in the rainy side of Hawaii a lifetime without making the acquaintance of the white-faced form.

Under the name of *sandwichensis* Mr. Rothschild has described both forms, he appearing to consider the chestnut-faced form an intermediate phase, of which the white-faced form is the final plumage. His figures of *sandwichensis* (opp. p. 71) afford an excellent idea of that form; while his figure of *sandwichensis* 'Fere adult' (opp. p. 75) is a fair representation of *ridgwayi*, though about the head inclining towards the intermediate stage.

As the two birds have been minutely described more than once, though never as related but distinct forms, the descriptions below are purposely made brief, though sufficient for their discrimination.

Chasiempis sandwichensis (Gm). WHITE-FACED ELEPAIO.

Adult male.—Above olive brown, with white streakings on hind neck and middle back; forehead, lores, superciliary stripe and rump pure white; cheeks more or less blackish; wings and tail dark brown; wing-coverts black tipped with white, forming a bar across the greater coverts; under parts as in next form; less chestnut along sides of body and across breast in interrupted patches; all but middle pair of tail feathers tipped with white, the outer ones more broadly; legs and feet blue; upper mandible black with a bluish cast, cutting edge blue; lower mandible blue.

Adult female.—Similar to male but generally with less white about the head, and with whiter throat.

Juvenile.—Similar to the like state of *ridgwayi* but lighter throughout, and with the frontal and superciliary lines plainly indicated.

C. sandwichensis ridgwayi (*Stej.*). CHESTNUT-FACED ELEPAIO.

Adult male. — Color above dark brown with chestnut shade; forehead, lores, a line above eye and sides of head chestnut, the cheeks showing more or less black; wings and tail blackish brown; greater wing-coverts black, tipped with white, thus forming a white wing-bar; middle coverts black-tipped, interrupted with white; chin always, and sometimes most of throat, black; feathers of lower throat for a variable distance tipped with white, which color meets the chestnut of sides of head; breast, sides and flanks light chestnut; belly and under tail-coverts white; three outer tail feathers tipped with white, outer ones more broadly; legs and feet and lower mandible (save tip) blue; upper mandible black with bluish cast; cutting edge blue.

Adult female. — Above lighter brown, with chestnut tinge; all the feathers of throat usually white tipped, though, not rarely, chin black; otherwise like male.

Juvenile. — Above ochraceous brown; bright ochraceous on rump and browner on head; wings and tail dark brown; wing-coverts tipped with ochraceous; below drab gray, passing into white on abdomen; legs and feet light bluish; lower mandible, extreme tip dark brown; upper mandible brownish black.

Adult males of both forms occasionally have the entire throat black (feathers of head and throat of all adults are black at base), with perhaps a few white-tipped feathers on its lower edge. Females may usually be distinguished by the white throats, but occasionally the chin is black and, as some males that have not quite reached the final stage (it is possible that some never assume the highest stage of plumage) are similarly colored, this test is not always reliable.

In some individuals of *sandwichensis* the white on sides of neck meets the white markings on the hind neck, and thus tends to form a nearly complete white collar.

The general tints of the typical *sandwichensis* are lighter than the corresponding plumages of *ridgwayi*. Frequently there is so much white about the head of adult male *sandwichensis* that they can be distinguished as far as seen, they appearing to be white-headed.

At all seasons of the year individuals of both forms are to be found in an intermediate stage of plumage, and, as they breed in this condition, the plumage might almost be described as a definite

phase. However no two individuals are alike. The ochraceous of the rump in this phase is mixed with white, as, also, are the ochraceous wing-bars; the gray of breast and sides is brownish, or even chestnut, while the throat shows white feathers, with more or less black if a male.

In the juvenile phase there is considerable variation in the amount of ochraceous below, some having scarcely any while others are strongly tinged with it.

LIST OF BIRDS OBSERVED IN THE NEIGHBORHOOD OF WEQUETONSING, EMMET CO., MICH.,
JULY 9 TO JULY 23, 1901.

BY O. WIDMANN.

WEQUETONSING — an Indian name meaning Harbor of Rest — is a reputed summer resort in the northwestern part of Lower Michigan under latitude $45^{\circ} 30'$, thus corresponding to that of central Maine. It is one of several similar resorts clustered in a half circle around Little Traverse Bay, among them, Harbor Point and Harbor Springs on one side, Roaring Brook, Bayview and Petoskey on the other.

As the region has apparently never been examined by any recorder of birds, it is of some interest to learn what the bird fauna consists of during the breeding season. The woods, parts of which are yet in an almost primitive condition, are composed of a variety of deciduous trees with a strong admixture of pines, hemlocks and balsams. Thickets of white cedar are growing along the shore and tamaracks in a swampy place back of Harbor Springs. Not much farming is done in the immediate vicinity of the resorts except at Petoskey, which is quite a town with a considerable permanent population, while the other places are more or less deserted from the latter part of September to the middle of June.