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## A COLLECTION OF BIRDS FROM THE AZORES

BY ROBERT CUSHMAN MURPHY AND JAMES P. CHAPIN

In the Ibis for 1923, pp. 44-49 and 190, Murphy reported upon a small collection of birds from the Azores, listing *Larus hyperboreus* and *Actitis hypoleucos* as additions to the known avifauna of the archipelago. The present notes relate to a more recent series of specimens obtained by the same collector, Mr. José G. Correia. These still further extend the large list of New World birds that have visited the Azores and also include new records for individual islands. As heretofore, the chief sources consulted have been the monographic paper by Hartert and Ogilvie-Grant (Novit. Zool., 1905, XII, pp. 80-128), and Dr. Hartert's 'Vögel der Paläarktischen Fauna.'

Mr. Correia's trip to the Azores was purely personal. It was made in order that he and his wife might revisit their old homes, at Fayal and Terceira respectively, after an absence of several years among the islands of the South Pacific Ocean. He took advantage, nevertheless, of the opportunity to observe and collect, and with such success that examples of thirty-five species of birds were sent by him to The American Museum of Natural History.

His notes and labels indicate that the localities and periods of field work were approximately as follows:

Fayal, Apr. 13-May 16; Terceira, May 17-June 14; Fayal, June 15-July 2; Pico, July 6-Aug. 31; Fayal, Sept. 1-Sept. 20; Terceira, Sept. 23-Oct. 31; San Miguel, Nov. 5-Nov. 27; Terceira, Nov. 28-Dec. 15; Fayal, Dec. 16-Jan. 15.

He left Boston, Mass., on April 7, 1927, and arrived at Horta, Fayal, on the 13th. Spring rains, then in progress, continued steadily for ten days, so that the soil was thoroughly soaked when he took to the field on the afternoon of April 23.

At this season considerable numbers of birds were distributed over the tilled land. Chaffinches were to be seen in large flocks in the fresh green fields; the blackbirds were more dispersed, although groups of as many as eight were sometimes together. Starlings seemed scarce, doubtless because their breeding period was already well under way. The canaries, too, had paired and were building nests. The female

woodcocks were still incubating, and males alone appeared for short flights at evening. The best opportunity for collecting woodcocks of both sexes proved to be during the feeding time of early morning, but even then they seemed far less abundant than during the love-flight period of late February and March. The wood pigeons, which are likewise so conspicuous at certain seasons, were to be found only about sunrise, when they were resting in evergreen trees between the feeding hour and the return to the nest. During full daylight not one was to be seen.

During the voyage between Fayal and Terceira, in the middle of May, many thousands of the large Azorian shearwaters (*Puffinus kuhlii borealis*) were observed at sea, as well as a few small black petrels (*Oceanodroma*) near Graciosa, and examples of the Azorian gray-backed gulls in the vicinity of the ports. An islet off Graciosa was covered with a breeding colony of common terns.

At Terceira the land birds seemed peculiarly tame when compared with those of Fayal. The commonest Terceiran species proved to be the rock dove, and after this the blackbird. Chaffinches and canaries were numerous on the hillsides, and kinglets and wood pigeons were reported from the higher forests, although Correia did not personally observe them.

Returning to Fayal about the middle of June, he found the young birds of most species out of the nests and following their parents. The young starlings alone appeared to flock by themselves. Rock doves, starlings and quail were confined to the open country; woodcock and kinglets clung exclusively to the forests; all other species, according to his notes, were to be found more or less in country of either type.

On July 6 he journeyed to Pico, making camp on the south coast at a site that he had occupied six years earlier. Great destruction of the sea birds had apparently taken place in the interim, for but few terns and shearwaters were now to be found at breeding places formerly occupied by thousands. Native boys had carried away many shearwater eggs and chicks shortly before his arrival.

At Pico, as at Terceira, the rock dove and blackbird outnumbered all other terrestrial species. Collecting during July and August proved difficult, for most of the birds had withdrawn into brush country where they were silent and secretive. In the first week of September he returned to Fayal and made a special effort to secure young and moulting birds of the various species.

On September 23, Correia landed at Praia da Victoria, Terceira, remaining at the island through October and collecting many interesting

residents and autumn migrants. Rainy and windy weather was the rule throughout this period. During the second week of October, flocks of northern shore birds began to arrive on the beaches, usually remaining only a day or two and then departing. Ducks, herons, grebes (including the North American pied-billed grebe), curlews, and brown-headed gulls were also among the migrants observed about the lake and marsh at Praia da Viçtoria. Later in the month flocks of goldfinches arrived at Terceira, possibly from another island, and the species soon became abundant.

On November 5, Correia began a three week's stay at San Miguel, where with the aid of the American Consul and Professor Antonio Silveira Vicente, curator of the museum at Ponta Delgada, he continued his successful field work and secured examples of the endemic bullfinch. This rare bird and the green finch (*Chloris chloris aurantiiventris*) were the only Azorian species that he observed exclusively at San Miguel.

On November 27, he once more sailed for Terceira, where he collected during two weeks of steady rainfall, before returning to Fayal. At the latter island he made a notable addition to the avifauna of the Azores by obtaining a snowy owl (*Nyctea*) on January 14.

**Podilymbus podiceps** (Linnæus)

*Colymbus podiceps* LINNÆUS, 1758, 'Syst. Nat.,' 10th Edit., I, p. 136 (Carolina).

A female taken at Terceira, October 24, 1927, constitutes the first record for the Azores. It is apparently a bird of the year.

**Podiceps nigricollis nigricollis** Brehm

*Podiceps nigricollis* BREHM, 1831, 'Handb. Naturg. Vög. Deutschland,' p. 963 (Germany).

A male taken at Terceira on September 24, 1927, was in winter plumage, and plainly adult, as it still shows a few lengthened straw-colored feathers in the ear-region.

**Puffinus kuhlii borealis** Cory

*Puffinus borealis* CORY, 1881, Bull. Nuttall Orn. Club, VI, p. 84 (near Chatham Island, Cape Cod, Mass.).

NATIVE NAME.—Cagarro.

Pico, July 9, 12, 25, 26, 1927. Some of these had large and some small gonads.

Figure 1 illustrates the size relationship of this race as compared with the typical Mediterranean form and the still smaller subspecies of the Cape Verde Islands.

Seven eggs taken from crevices along sea cliffs at Pico, on July 12, were all heavily incubated. They are white, though all more or less

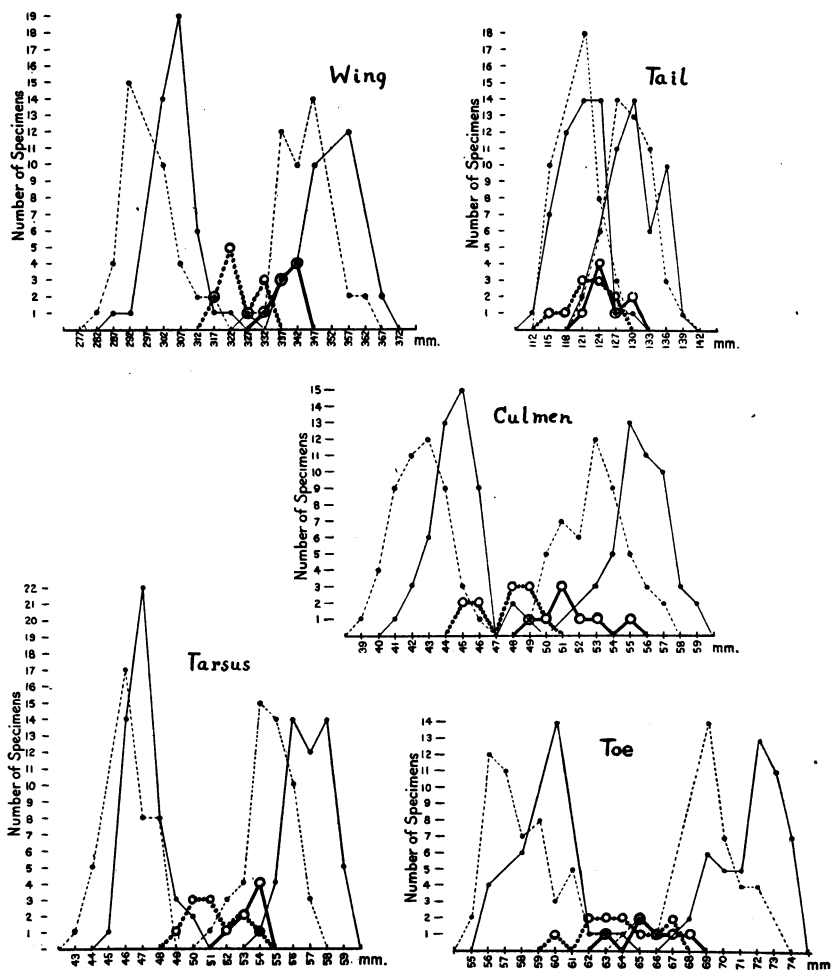


Fig. 1. Frequency distribution curves showing the variation and size relationship in three geographic races of *Puffinus kuhlii*. Solid lines represent males, dotted lines females. Left pair of graphs, 50 males and 50 females of *Puffinus kuhlii borealis* from Pico Island, Azores; middle pair of graphs (heavy), 9 males and 11 females of *Puffinus kuhlii kuhlii* from Majorca and Minorca, Balearic Islands; right pair of graphs, 50 males and 50 females of *Puffinus kuhlii edwardsi* from Razo and Brava, Cape Verde Islands.

The Mediterranean or typical subspecies is shown to be exactly intermediate in size between the Azorian and Cape Verde races. Discrepancy in the height of the graphs results from the fact that they are based upon measurements of 100 specimens of two races but only 20 of the third.

stained. The surfaces are rather evenly pitted with fine, pin-point depressions, and the form is highly variable. The measurements of the series are as follows:  $73 \times 50$ ,  $72 \times 51.5$ ,  $76 \times 50$ ,  $75 \times 50$ ,  $75 \times 49.5$ ,  $76 \times 49$ ,  $74 \times 50$  mm.

In connection with the date and condition of the shearwater eggs from Pico, it may be well to refer to a series of downy young of the same species collected by Mr. Jesse Metcalf during the cruise of the yacht 'Wawaloam' at the Desertas and Salvages Islands in September and October, 1926. The youngest of eight specimens is a half-grown chick still completely covered with down, taken at Bugio on September 23. Another from the Desertas, dated September 19, is appreciably more advanced, as the down has been moulted from most of the dorsal surface. The others, dated at Gran Salvage October 3-8, are nearly full-grown, though much down still clings to their breasts and bellies. One of these is an isabelline specimen, with white down tinged with fawn-color, and with contour feathers of a very pale brownish-gray.

***Ardea cinerea cinerea* Linnæus<sup>1</sup>**

*Ardea cinerea* LINNÆUS, 1758, 'Syst. Nat.,' 10th Edit., I, p. 143 (Europe; restricted type locality, Sweden).

NATIVE NAME.—Arêlo.

Terceira, October 11; Fayal, October 15, 1927.

No specimen in the series is fully adult. Since Ogilvie-Grant saw the species at Flores and Graciosa in April, it probably breeds in the Azores.

***Branta bernicla bernicla* (Linnæus)**

*Anas Bernicla* LINNÆUS, 1758, 'Syst. Nat.,' 10th Edit., I, p. 124 (northern Europe).

An immature female taken on the lake at Furnas, San Miguel, on November 16, 1927, constitutes the first record from the Azores. This individual is in the light-bellied plumage, and is very small, with a wing of only 305 mm.

***Buteo buteo rothschildi* Swann**

*Buteo buteo rothschildi* SWANN, 1919, 'Synopt. List Accipitres,' part 2, p. 48 (Azores).

NATIVE NAME.—Milhafre.

Fayal, January 13, 14, 1928, July 1; Pico, August 16; Terceira, October 10, 1927.

Some January specimens showed a slight enlargement of the gonads.

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<sup>1</sup>An addition to the avifauna of the Azores is the following:

***Platalea leucorodia leucorodia* Linnæus**

*Platalea leucorodia* LINNÆUS, 1758, 'Syst. Nat.,' 10th Edit., I, p. 139 (Europe).

Thomson (1926, 'Problems of Bird-Migration,' p. 231) states that a banded example from Holland has been recovered in the Azores.

The wing-length of eight males is 335–354 mm.; of six females, 353–365, dimensions somewhat shorter than those recorded by Hartert ('Vög. Paläarkt. Fauna,' p. 2203). In this small island race the variation in color is much less marked than in typical *buteo*, but there are almost always dark areas on the sides of the chest, flanks, and tibiae.

*Buteo oreophilus*, of the mountains of eastern Africa, bears a slight general resemblance to *rothschildi*, agreeing also in the primary formula, but it lacks the above-mentioned dark areas. Of the various buzzards breeding in tropical Africa, it is the one most likely to be regarded as a representative of *Buteo buteo*.

**Cerchneis tinnunculus tinnunculus** (Linnæus)

*Falco Tinnunculus* LINNÆUS, 1758, 'Syst. Nat.,' 10th Edit., I, p. 90 (Europe: restricted type locality, Sweden).

NATIVE NAME.—Francelho.

An immature male, Terceira, December 7, 1927.

**Coturnix coturnix conturbans** Hartert

*Coturnix coturnix conturbans* HARTERT, 1917, Novit. Zoöl., XXIV, p. 423 (Santa Maria Island, Azores).

NATIVE NAME.—Codorniz.

Fayal, May 4, 9, 13, June 27, July 1, 2, September 5, 27, December 3, 1927, January 12, 1928; Terceira, September 28, December 7, 11, 1927.

Comparison with a series of 14 specimens of *C. c. africana* from Natal, the Kasai District, and the highlands northwest of Lake Edward, shows how closely similar *conturbans* is to *africana*. We doubt whether specimens could be distinguished unless their localities were known. It is true that in two cases the wings of our specimens of *africana* reach 110 mm., but the others fall within the range of variation for *conturbans* (99–105 mm.). In our opinion the Azorian birds are scarcely, if at all, more rufous on the upper surface of the wing.

Practically all specimens obtained between May and early September had enlarged gonads and one female taken at Fayal on September 5 contained an egg with a fully formed shell, which is preserved in the collection. Another collected on the same date had a soft egg in the oviduct. Yet on the same day Correia secured a young quail with a wing 85 mm. long, but with all the primaries enclosed in sheaths at their bases. A farmer of Fayal reported that he had found a quail's nest containing seven fresh eggs on September 26, 1925.

The egg referred to as taken from the oviduct of a dead bird is immaculate and of a pale buffy color. It measures 30×24 mm. A set of nine eggs, quite fresh, was taken from under a sitting bird at Simo da

Lomba, Fayal, on July 1, 1927. The nest was in a field of hay and was made entirely of grass. Over an olivaceous ground-color the eggs are washed with a coffee tone and are boldly splotted and spotted with rich chocolate-brown. Their range in dimensions is included within the following figures:  $26 \times 23$ ,  $28 \times 23$ ,  $27.5 \times 22$  mm.

***Crex crex* (Linnæus)**

*Rallus Crex* LINNÆUS, 1758, 'Syst. Nat.', 10th Edit., I, p. 153 (Europe: restricted type locality, Sweden).

NATIVE NAME.—Codornizão.

One female, Fayal, January 9, 1928, which was thus a wintering bird. It is doubtful whether the species breeds in the Azores.

Correia notes that the specimen was shot from a flock of quail, which recalls the classical tradition of the corn crake's leading the quail on their migrations, an idea connoted by the Greek *Ortygometra*, the German vernacular Wachtelkönig, and the Portuguese codornizão.

***Gallinula chloropus correiana*, new subspecies**

SUBSPECIFIC CHARACTERS.—Similar to *Gallinula chloropus chloropus*, but frontal shield larger at all seasons, head and throat more deeply black, coloration of lower-parts more bluish slate, especially at the sides of chest; abdomen with much less white on the tips of the feathers; claw of middle toe pronouncedly straighter than is common in European birds.

The coloration of the back and of the upper surface of the wings is about the same as in typical *chloropus*, and the wing-length is also about equal.

TYPE.—No. 222,249, Amer. Mus. Nat. Hist.; ♂ ad.; Terceira Island, Azores; December 8, 1927; José G. Correia.

MEASUREMENTS.—(3 adults of each sex): wing, ♂, 172–184, ♀, 171–175; tail, ♂, 71–80, ♀, 69–73; bill from posterior margin of frontal shield, ♂, 42–46, ♀, 38–40; maximum breadth of shield, ♂, 12–13, ♀, 11–11.8; tarsus, ♂, 47–50, ♀, 47–48; middle toe with claw, ♂, 72–74, ♀, 65–66 mm.

RANGE.—We have examined specimens only from the island of Terceira, but an Azorian moorhen has likewise been recorded from San Miguel.

NATIVE NAME.—Gallinha d'agua.

Twelve specimens, Terceira, September 26, October 11, 12, 28, December 7, 8, 1927.

Adults and immature examples are included in the series, several of the former being taken as late as December. Both males and females collected during the latter month showed distinct enlargement of the gonads. Like the resident coots, our adult moorhens, especially the December specimens, have the plumage of breeding birds, with enlarged and swollen frontal shields. While Hartert does not mention the breed-

ing of the species in the Azores, it seems certain that it does so and that it begins its nesting period in mid-winter.

In a sense, the Azorian moorhen is analogous to the endemic quail in that it is somewhat intermediate between the European and the African forms. We have compared our series with skins of European birds in the American Museum collection and also with an excellent representation of eight specimens from Ireland, Holland and Turkestan, kindly lent to us by the Museum of Comparative Zoölogy. In all stages the adults of both sexes from the Azores have distinctly blacker heads and more slaty-blue breasts and flanks than any of the European examples. In this respect they resemble *brachyptera* of tropical Africa, but the back and wing-coverts are of about the same olive-brown shade as in the typical European race. The most striking distinction of the Azorian subspecies is the blackness of the belly in adults. October specimens in fresh plumage, for example, show only a slight white tipping on an area which is prevailingly slaty gray. In this respect they contrast sharply with comparable specimens from England (the restricted type locality) and from elsewhere in Europe. The difference in the character of the middle claw is a curious one, and we are not certain that it can always be relied upon. Nevertheless, every one of the specimens from Terceira has distinctly straight nails on the middle toe which contrast with the curved claws of the lateral toes. This condition is not matched among the examples from England, Ireland, or the continent, although occasionally there is a sporadic approach toward it.

Immature examples from Terceira have the feathers of the breast and flanks more bluish, if the buff or white tips of these feathers are disregarded, than European specimens of the same age. Their crowns seem likewise to be darker.

Mr. Correia's notes on the flesh colors of the Azorian moorhen are accompanied by careful water-color sketches of the head and foot. Iris, red (brown in immature birds, and also in one clearly adult female collected on September 26); bill and frontal shield, red, both mandibles tipped with yellow from about halfway toward the nostrils; bare portion of tibiæ, scarlet; heel joint and toes, dark greenish-yellow; tarsi and anterior aspect of proximal phalanges, light greenish-yellow. In immature birds, all the flesh colors are, naturally, duller.

***Fulica atra atra* (Linnæus)**

*Fulica atra* LINNÆUS, 1758, 'Syst. Nat.,' 10th Edit., I, p. 152 (Europe: restricted type locality, Sweden).

NATIVE NAMES.—Galeirão, mergulhão.



Terceira, September 23, October 8, 10, December 7, 1927.

The September example is a bird of the year. Adults of both sexes are recorded as showing incipient swelling of the gonads by October 10, and marked enlargement by December 7. It would seem that coots in the Azores must begin nesting in December or January, while in England they begin only in March.

In the marsh at Praia da Victoria, Terceira, the coots confined themselves characteristically to the patches of open water, while the moorhens remained among the reeds and lily pads. Correia never saw the two species close together.

**Charadrius alexandrinus alexandrinus** Linnæus

*Charadrius alexandrinus* LINNÆUS, 1758, 'Syst. Nat.,' 10th Edit., I, p. 150 (Egypt).

Terceira, October 12, 28, 1927.

Though stated by Hartert to breed on the Azores, the Kentish plover was collected by Correia only at the time of the southward migration. The three specimens are in winter plumage.

**Oxyechus vociferus vociferus** (Linnæus)

*Charadrius vociferus* LINNÆUS, 1758, 'Syst. Nat.,' 10th Edit., I, p. 150 (Virginia and Carolina).

One female, Fayal, January 4, 1928.

The first record of the killdeer from the Azores. Hartert mentions three occurrences in Great Britain and one at Madeira.

From the rusty margination on the upper wing-coverts, and the buffy tinge on the white ring separating the throat and breast bands, our specimen looks like a bird of the year.

**Crocethia alba** (Pallas)

*Tringa alba* PALLAS, 1764, in Vroeg, 'Cat. Adumbriaticula,' p. 7 (Holland).

Terceira, October 12, 28, 1927.

Twelve specimens in winter plumage. The sanderling is probably not an uncommon migrant, although previously known only from a single example taken at San Miguel.

**Limosa limosa limosa** (Linnæus)

*Scolopax Limosa* LINNÆUS, 1758, 'Syst. Nat.,' 10th Edit., I, p. 147 (Europe: restricted type locality, Sweden).

One male, Terceira, September 23, 1927; in immature plumage, with a culmen of only 79 mm.

***Scolopax rusticola rusticola* Linnæus**

*Scolopax Rusticola* LINNÆUS, 1758, 'Syst. Nat.,' 10th Edit., I, p. 146 (Europe: restricted type locality, Sweden).

NATIVE NAME.—Gallinhola.

Fayal, February 21, May 10, 19, 1927.

The February birds already showed enlargement of the gonads. A female dated May 19 was incubating.

A set of four eggs taken in woods near Flamengos, Fayal, on May 10, was quite fresh. Their ground color ranges between avellaneous and wood-brown. The blotchings are of various shades of brown, from very pale to Vandyke-brown. Three of them are rather generally blotched but in the fourth the heavy pigmentation is confined to a ring around the SMALLER end. They measure:  $41.5 \times 34.5$ ,  $41 \times 35$ ,  $40 \times 34$ ,  $41 \times 33$  mm.

***Larus fuscus atlantis* Dwight**

*Larus fuscus atlantis* DWIGHT, 1922, Amer. Mus. Novit., No. 44, p. 1 (Fayal, Azores).

NATIVE NAMES.—Gaivota, ganhoa.

Fayal, May 4, 11, 1927, January 4, 14, 1928.

An excellent series of birds in various stages of plumage. The spring adults were breeding birds, and a female collected on May 11 contained an egg ready to lay.

The iris in adults was yellow, the feet and legs, yellow. In young birds the iris was brown, the feet and legs, "cream."

We follow Dwight (1925, Bull. Amer. Mus. Nat. Hist., LII, pp. 215, 216, Fig. 139) in regarding the Azorian gull as a race of *fuscus*.

***Hydrocolæus ridibundus ridibundus* (Linnæus)**

*Larus ridibundus* LINNÆUS, 1766, 'Syst. Nat.,' 12th Edit., I, p. 225 (Europe).

Fayal, January 7, 24, 1928.

Adults in winter plumage and young of the year.

This gull in winter plumage is locally known by the Portuguese equivalent of "four-eyes," because of the dark spot behind the eye. The specimens were collected on farm-land two thousand feet above sea-level. The birds were observed also about the lake at Furnas, San Miguel.

The species is a regular migrant to the Azores, and Thomson (1926, 'Problems of Bird-Migration,' p. 231) has recorded the recovery of an example banded in Yorkshire.

***Sterna hirundo hirundo* Linnæus**

*Sterna hirundo* LINNÆUS, 1758, 'Syst. Nat.,' 10th Edit., I, p. 137 (Europe: restricted type locality, Sweden).

Pico, July 9, Aug. 19, 1927.

All with enlarged gonads. A female collected on August 19 was mating at that late date.

Twenty sets of eggs, mostly slightly incubated, were taken from a large colony of common terns at Pico on July 9. The eggs lay on bare lava rock, and no set comprised more than two. In twelve cases out of the twenty there was but one. This would seem to be notable, for the same species in eastern North America usually lays three or four, often five, eggs, while in northern Europe three is commoner than two. Possibly both the small sets and the late date of the Azorian specimens are explicable on the grounds that the parent terns had bred before during the season.

The variation in size, form, and pattern of the eggs presents no unusual features. Characteristic measurements from a series of 28 are as follows:  $46 \times 32.5$ ,  $39 \times 30$ ,  $41 \times 29.8$ ,  $44.3 \times 31.2$ ,  $45.3 \times 31$ ,  $40 \times 31$ ,  $42 \times 31.5$ ,  $43 \times 32$  mm. Extreme dimensions among 18 common tern eggs from New York, Rhode Island and Massachusetts are:  $43.5 \times 31$ ,  $38 \times 29.5$ ,  $40 \times 29$  mm.

***Sterna dougallii dougallii* Montagu**

*Sterna Dougallii* MONTAGU, 1813, 'Orn. Dict. Suppl.,' no page (Firth of Clyde, Scotland).

A female, not in breeding state, Pico, July 9, 1927.

The first definite record of the species from the Azores. Hartert and Ogilvie-Grant (p. 101) report: "*Sterna dougalli* is said to have occurred by Godman and Simroth."

***Columba livia* Gmelin**

*Columba domestica*  $\beta$  *livia* GMELIN, 1789, 'Syst. Nat.,' I, p. 769 (no type locality; later restricted to southern Europe).

NATIVE NAME.—Pomba da rocha.

Pico, July 8, 12, 13, 21, 27; Terceira, October 11, 1927.

The July specimens were in breeding condition; those taken in October had small gonads.

It is quite evident that all these pigeons are the descendants of domestic birds. All but one are very dark-colored, if not blackish, above, and flecked with gray on the wing-coverts. Yet more than half

of them have white rumps. Only a single specimen approaches the wild coloration, but it is dark on the head and its rump is bluish gray.

At Pico in July the rock doves spent much time about human dwellings, perching on roofs and stone walls and waiting for the inhabitants to feed the poultry. At such times they would fill their crops quickly and then fly off to their crevices among the sea cliffs.

The contents of four full crops of rock doves, collected by Mr. Correia at Pico, have been analyzed by Mr. E. R. Kalmbach, of the United States Bureau of Biological Survey, as follows:

1.—Percentage of animal matter, 0; of vegetable, 100; of gravel, etc., trace. Contents: 48 seeds of *Chætochloa glauca* + 2 *Bromus* sp., 1 per cent; 80 seeds of *Sherardia arvensis* + several of *Salium* sp. + 20 *Ornithopus*, probably *rosea* + 1 *Euphorbia*, 1 per cent; 4 *Glycine* sp. + 2 seeds of another legume + 43 seeds of *Vicia* sp., 10 per cent; fragments of foliage, 2 per cent; 49 tubers of a sedge (*Cyperus*), 15 per cent; at least 50 tubers of *Stachys* sp. (?), 71 per cent; 1 kernel of rye + hulls of corn (*Zea mays*), trace.

2.—Percentage of animal matter, trace; of vegetable, 100; of gravel, etc., 1. Contents: 1 *Polygyra* sp., trace; shell of hen's egg, trace; 123 seeds of *Glycine*, 68 per cent; 30 of *Ornithopus* sp., probably *rosea*, 2 per cent; hulls of corn (*Zea mays*), trace; 25 tubers of a sedge (*Cyperus* sp.), 10 per cent; 16 tubers of *Stachys* sp. (?), 20 per cent.

3.—Percentage of animal matter, trace; of vegetable, 100; of gravel, etc., 1. Contents: 1 *Polygyra* sp., trace; 32 seeds of *Spergula* sp., 1 per cent; 3 seeds of *Glycine* sp., 1 per cent; 380 tubers of a sedge (*Cyperus*), 93 per cent; 6 tubers of *Stachys* sp.?, 5 per cent; hulls of corn (*Zea mays*), trace; foliage, trace.

4.—Percentage of animal matter, trace; of vegetable, 100; of gravel, etc., 1. Contents: head and thorax of 1 *Calendra zea-mais*, trace; 23 larvæ + 1 puparium of *Sarcophaga* sp., trace; 2 *Polygyra* sp., trace; fragments of shell of hen's egg, trace; 6 tubers of *Cyperus* sp. + 3 other tubers, 3 per cent; 82 soy beans (*Glycine*) + 2 other *Glycine* + 20 *Vicia* sp. + 78 *Ornithopus*, probably *rosea*, 25 per cent; 1 *Euphorbia* sp. + 6 *Sherardia arvensis* + 31 *Spergula* sp. + 4 *Bromus* sp., 1 per cent; 68 kernels of yellow dent corn, 66 per cent; 115 kernels of rye, 4 per cent; fragments of "excelsior," 1 per cent.

NOTE.—The *Sarcophaga* larvæ are present possibly through the exposure of the stomach contents before preservation.

### ***Columba palumbus azorica* Hartert**

*Columba palumbus azorica* HARTERT, 1905, Novit. Zool., XII, p. 93 (Terceira Island, Azores).

NATIVE NAME.—Pomba torcáz (or trocáz).

Fayal, April 28, May 9; Pico, July 16, 21, 22, 27, 28, 1927.

All in breeding condition. A female taken May 9 contained an egg ready to be laid. On July 22, when most of the young pigeons were already flying, Correia took a fully formed egg from a bird shot at Pico. It measures 40×27.6 mm.

We find, as Hartert has stated, that the Azorian birds are a little more richly colored than specimens of typical *palumbus* from western Europe. Their wings are slightly shorter, measuring in the present series, 230–246 (six males), 252 (two females). It is surprising that the females are both so large.

The wood pigeon was the only species observed eating ripe grapes from the vines. The crop contents of a Pico specimen has been analyzed by Mr. Kalmbach as follows:

Percentage of animal matter, trace; of vegetable, 100; of gravel, etc. 2. Contents: 1 *Calendra zea-mais*, trace; snail (*Zonitidæ*), trace; 1 seed of *Ornithopus*, probably *rosea* + 1 *Sherardia arvensis*, trace; 1 *Glycine* sp., trace; hulls of corn, trace; bits of foliage (*Amaranthus* sp.?), trace; at least 60 tubers of *Stachys* sp. (?), 100 per cent.

NOTE.—About 70 larval + 2 pupal sarcophagids present are apparently the result of the stomach material being exposed after collection—not classed as food.

### **Nyctea nyctea** (Linnæus)

*Strix Nyctea* LINNÆUS, 1758, 'Syst. Nat.,' 10th Edit., I, p. 93 (Sweden).

A female, Fayal, January 14, 1928.

This is the first record of the snowy owl from the Azores.

The specimen has greatly frayed primary quills and it is not impossible that it may have been carried in captivity on board some ship from the western side of the Atlantic. From the appearance of the wings one might conclude that it had retained little power of flight, but such is far from the case, as shown by Mr. Correia's notes.

The owl was first reported to him by a farmer of Fayal who sent him word that a large white bird of an unknown kind had flown past him rapidly and had alighted in the middle of a clear field. This was on the morning of January 12, but when Correia reached the spot the bird had gone. While discussing the matter with the farmer, however, it came by again at a distance of about five hundred feet, dropped over the sea cliffs and disappeared. Several hours later in the same day Correia saw the owl again, but only at a long distance. Next morning, January 13, another farmer said that a large white bird had come in from the sea and had rested on a stone wall about forty feet from where he was working, remaining quietly for an hour. Correia located the bird near this spot but was unable to get within range. On the afternoon of the following day, January 14, he and a friend stalked the owl for several hours and finally collected it while it sat on the ground in open country.

***Asio otus otus* (Linnæus)**

*Strix Otus* LINNÆUS, 1758, 'Syst. Nat.', 10th Edit., I, p. 92 (Europe: restricted type locality, Sweden).

NATIVE NAMES.—Môcho, coruja.

Terceira, October 7, 10, 13, 1927; Fayal, March 22, 1928.

The March bird was a male with enlarged testes. The long-eared owls of the Azores, though resident there, are not separable from the typical race. There is a slight variation in color, but while our most richly-hued specimen can be matched with the darker European and Asiatic examples, none of our four Azorian birds is as pale as the lighter-colored continental birds. Three males have wings measuring 274, 288, 292 mm.; one female, 286.

***Alauda arvensis cantarella* Bonaparte**

*Alauda cantarella* BONAPARTE, 1832-1841, 'Iconogr. Fauna Ital., Uccelli,' Introd., p. 5 (Italy).

*Alauda arvensis cantarella*, MURPHY, 1923, Ibis, p. 48.

One female, Fayal, Jan. 14, 1928.

This specimen and a female taken by Correia at the same island on Jan. 5, 1922, have been compared with the series of European skylarks in the British Museum and in the Zoölogical Museum at Tring. They agree with females of the race *cantarella* from Spain, Cyprus, and other Mediterranean localities. The same subspecies was recorded as a migrant in the Azores by Hartert and Ogilvie-Grant.

***Motacilla cinerea schmitzi* Tschusi**

*Motacilla boarula schmitzi* TSCHUSI, 1900, Orn. Jahrb., XI, p. 223 (Madeira).

NATIVE NAMES.—Labandeira, arvelhina.

Fayal, May 2, 4, June 30, July 1; Pico, July 9, 12, 13, 29, August 18; Terceira, October 11; San Miguel, November 11, 1927.

This series exhibits the subspecific characters given by Dr. Hartert ('Vögel Pal. Fauna,' p. 301), and we find that five adult females taken between May and August have the throats blackish, mixed with gray. The wing-length in four adult males is 83-86 mm.; six adult females, 77-80.

The breeding season of the wagtail evidently extends into July. November birds from San Miguel are in fresh plumage, with white throats.

***Regulus regulus azoricus* Seebohm**

*Regulus cristatus* var. *azoricus* SEEBOHM, 1883, 'Hist. Brit. Birds,' I, p. 454 (Azores: type locality here restricted to San Miguel).

NATIVE NAME.—Cespina.

San Miguel, Nov. 10, 11, 15, 16, 1927.

Seebohm's description, which distinguishes no particular island, is as follows:

On the Azores a form is found having the olive-green nape of *R. cristatus*, but with a much larger bill, the culmen measuring .5 inch instead of .45 to .4. I propose to call this form *Regulus cristatus* var. *azoricus*.

This might apply to specimens from any island of the group, but we find that in all probability the only Azorian skins available to Seebohm at the time of his study were three in the Salvin and Godman collection, taken during March and April, 1865, and deposited in the British Museum in 1879. Two of these are from San Miguel, the other from Fayal.

Now since the goldcrest of San Miguel proves to be subspecifically distinct from that of Fayal and the other islands of the Azores, we hereby arbitrarily restrict the type locality of Seebohm's race to San Miguel, and designate as the type specimen Brit. Mus. Reg. 1879, 4. 5. 307, ♀, April, 1865, F. Godman.

Our seven San Miguel skins are all heavily washed with olive-buff on the ventral surface, and in this respect are strikingly different from goldcrests collected by Correia at Fayal and Pico during January, February, April, May, July, August, November, and December (years 1921, 1922, 1927). Moreover, twenty additional San Miguel specimens examined by the senior author in the British Museum, and dated during the months of March, April, and May, can likewise be picked out from the remainder of the large Azorian series by the color of their ventral surfaces, without the necessity of consulting the labels. Dr. Hartert's suggestion that such plumage differences may be seasonal would seem, therefore, to be invalidated.

The size of the bill in both Azorian races is quite appreciably larger than in European specimens. Measurements of ten males and females of *azoricus*, from San Miguel, fall within the following ranges: wing, 51–55; tail, 35–38; bill from proximal end of nostril, 8.5–9.5 mm. The last measurement is more easily determined with exactitude than the length of the culmen.

#### ***Regulus regulus inermis*, new subspecies**

SUBSPECIFIC CHARACTERS.—Similar to *Regulus regulus azoricus*, but distinctly less olive-buffy on the entire ventral surface, and with soiled whitish areas on throat, belly and flanks, which are rarely if ever apparent in examples of the San Miguel race.

TYPE.—No. 222,332, Amer. Mus. Nat. Hist.; ♂ ad.; Pico Island, Azores; July 22, 1927; José G. Correia.

MEASUREMENTS.—(16 males and females from the six islands listed below): wing, 51–55; tail, 36–39; bill from proximal end of nostril, 8.2–9.5 mm.

RANGE.—Islands of Santa Maria, Terceira, Pico, Fayal, San Jorge, and Flores, Azores Group.

NATIVE NAMES.—Ferfolha, estrellinha.

Fayal, April 28, May 10; Pico, July 14, August 13, 1927.

We have compared the recently collected specimens with others obtained by Correia during 1921–22, as well as with the excellent series in the British Museum, to a total number of 46 examples of this race from the six islands named above.

This subspecies appears not to differ in size from the endemic form of San Miguel, but all examples are sufficiently lighter and grayer on the ventral surface so that adults may be distinguished at a glance from those of San Miguel, and without regard to condition of plumage or time of year.

Birds from the different islands, even from such widely separated breeding stations as Santa Maria and Flores, are remarkably uniform. Indeed, only specimens from Fayal, the nearest island to the type locality, have a very slightly darker ventral aspect than the average range among those collected at the other localities. In this respect, Fayal birds show a bare suggestion of being intermediate, though the approach is too vague to be definitely described, and the affinities of the resident birds are clearly with *inermis* rather than with *azoricus*.

The phenomena presented by the two races of goldcrests in the Azores—one generally distributed, the other exclusive at a single island—is a familiar one in insular zoölogy. It is particularly well known to entomologists. In ornithology, a parallel case is that of the warblers (*Conopoderas*) inhabiting the Tuamotu atolls of the South Pacific. Twenty-eight far-flung islands of this group, for example, are occupied by a single subspecies, whereas two apparently undifferentiated islands have slightly distinct endemic races (cf. Murphy and Mathews, 1929, Amer. Mus. Novit., No. 350, pp. 3–14). San Miguel is the largest body of land in the Azores, and it may have environmental peculiarities. Probably, however, the essential problem is bound up chiefly with the segregation of a mutant strain.

Ferfolha, the commonest name of the goldcrest in the Azores, means “busybody.”

***Sylvia atricapilla atricapilla* (Linnæus)**

*Motacilla Atricapilla* LINNÆUS, 1758, ‘Syst. Nat.’ 10th Edit., I, p. 187 (Europe: restricted type locality, Sweden).

NATIVE NAME.—Toutinegra.



Fayal, April 26, May 3, September 8, 1927, January 12, 1928; Pico, July 22, 28; Terceira, September 27, October 13, December 12; San Miguel, November 15, 1927.

Fledglings were taken at Fayal on September 8.

On September 26, Correia observed at Terceira a blackcap in the phase which has been described as *S. a. heineken*. This plumage is seen often enough at the island to be popularly known, and to bear the vernacular name "Touto vinagreiro."

A nest with four fresh eggs, four feet from the ground in a small "incense tree" by the roadside, was taken at Flamengos, Fayal, on May 13. It is built of trailers of green fern-moss, lined with fine rootlets. The eggs are pale buffy, with evenly distributed blotchings of a brownish tone, and a few dark spots where the brown pigment is concentrated. They measure from  $20 \times 14.4$  to  $20 \times 14.8$  mm.

#### ***Erithacus rubecula rubecula* Linnæus**

*Motacilla Rubecula* LINNÆUS, 1758, 'Syst. Nat.,' 10th Edit., I, p. 188 (Europe: restricted type locality, Sweden).

NATIVE NAMES.—Paipalo, Santo Antonino (San Miguel).

Fayal, May 11, June 27, 30; Pico, July 2, 10, 13, 15, 27, Aug. 18; Terceira, September 27, 28, October 13, December 6; San Miguel, November 15, 17, 18, 1927.

The breeding season of the robin is evidently under way by early May. Fledglings were moving about by July 2.

November adults from San Miguel are in entirely renewed plumage, with slightly darker and richer red breasts than spring birds.

At Fayal, Correia found a robin's nest containing one egg, on a Monday afternoon. By Friday noon there were five, the full set.

The collection includes two nests, with sets of eggs. The first taken at Flamengos, Fayal, May 13, was in a hollow of a roadside embankment. The other, from Santo Antonio on the same island, May 14, was in the chink of a stone wall, two feet above a main and much-traveled highway. Both are made of rootlets, finest in the lining, with a few heavy grass or herb stalks in the outer structure. Their bowls are about 8 cm. in diameter. The eggs, five in one nest, six in the other, were fresh. They are white, with closely clustered specklings of army brown, which tend to be concentrated at the larger end, but which are more generally distributed on one egg in each nest. The dimensions are all included within the following figures:  $19 \times 14.3$ ,  $19.5 \times 14.5$ ,  $20 \times 15$  mm.

***Turdus merula azorensis* Hartert**

*Turdus merula azorensis* HARTERT, 1905, Novit. Zoöl., XII, p. 116 (Graciosa, Azores).

NATIVE NAME.—Melro preto.

Fayal, May 2, 3, 4, 6, 7, 9, 11, June 27, July 2, September 5; Pico, July 9, 10, 12, 15, 21, 22, 23, 25, 28, August 12; Terceira, September 28, October 10, 11, December 12; San Miguel, November 11, 14, 1927.

The Azorian blackbird is darker than the typical European race, blacker and glossier in the male, more blackish brown in the female. In coloration it is like *cabreræ* of Madeira and the western Canaries, with which it agrees in having rather short wings. But the tail in *azorensis* is a trifle shorter than that of *cabreræ*. Wing-length of twenty males of *azorensis*, 120–130 mm.; of sixteen females, 118–125 mm. Tails of twenty males, 93–102 mm.; of sixteen females, 83–95.

The differences between the three races mentioned above are, therefore, slight, and there is some overlapping in measurements. The bills of the island races may be slightly thicker, but the difference is not marked.

The blackbirds evidently have a prolonged breeding season. Eggs began to appear as early as May 2, and yet some females had the ovaries much enlarged toward the end of July. Fledgling young were collected as early as June 27 and as late as September 5.

Many September and October specimens, both adults and young, are moulting, while November birds are in handsome new plumage.

On one May day at Fayal, Correia found numerous unfinished nests, one containing three naked young, and another with four fledglings within a few days of their first flight. Sometimes two eggs constitute the full set. At Terceira he watched the building of a nest in a fig tree, six feet above the ground and close to a house. In this and other instances the female worked much more industriously than the male, making three or four trips for material while the male made one. The females were also more determined in defending the nests, pursuing an intruder with loud cries.

At Fayal during the middle of June, families of young blackbirds were following their mothers. When two youngsters were confined in a cage, the old female continued to feed them for many days, even waiting about a house in the morning for the cage to be hung out of doors. A stray youngster from another family was added to this group and all three were fed indiscriminately until they had attained full growth and were released.

Correia reports that both the bill and the legs of the blackbird turn dark during the post-nuptial moult.

The collection includes three nests with eggs. The nests are bulky affairs of grass, roots, vines and herb stalks, and, in one case, green moss. No mud enters into the construction. The linings are of fine wisps of grass and the skeletal structure of macerated leaves. Their bowls are approximately 10 cm. in diameter and of more than half that depth. The outside diameter of the thick-walled baskets measures up to 20 cm.

One, taken at Horta, Fayal, May 7, was built ten feet high in a Japan rose shrub, and contained four fresh eggs. Another, from Flamen-gos, Fayal, contained two eggs on May 13. This was in an "incense tree" in dense forest, built eight feet above the ground. The altitude of the region is 2000 feet above sea-level. The third nest, from Terceira, was six feet up in a fig tree overhanging a road, and contained three eggs on June 12.

The eggs in the three sets are of uniform appearance, with reddish flecks and fine blotches distributed rather evenly over a background of very pale blue or greenish blue. Their dimensions are included within the following figures:  $29 \times 21$ ,  $30.5 \times 22$ ,  $29.5 \times 22$ ,  $31.3 \times 22.6$  mm.

### ***Sturnus vulgaris granti* Hartert**

*Sturnus vulgaris granti* HARTERT, 1903, 'Vög. Pal. Fauna.,' I, p. 43 (Graciosa, Azores).

NATIVE NAME.—Estorninho.

Fayal, April 26, May 4, 6, 11, June 27, 28, July 2, 28, September 5, 6; Pico, July 26, 29, 30, August 11, 13, 16; Terceira, September 26, October 28; San Miguel, November 15, 1927.

We can scarcely confirm the differences given by Dr. Hartert to distinguish this race from typical *vulgaris*. The wings of 12 males measure 128–133 (130), of 7 females, 125–129 (127). Those of European birds: 5 males, 126–130 (128); 4 females, 126–129 (127.5). The bills of Azorian specimens do not seem narrower, and in 18 specimens of both sexes the extremes in length are 23 to 25 mm., or exactly as in 9 European specimens of both sexes.

The outermost primary of Azorian birds varies from 7.8 to 12.5 mm., that of European specimens from 10.5 to 13. mm. This seems to be the best-marked difference between the races.

The starlings breed early and flocks of young birds, mostly by themselves, begin to move about by the middle of June.

During the latter part of July the moult of the adults commences, and early in August the young birds begin to replace their gray juvenal feathers with the first winter plumage. By the end of September this transformation had been mostly completed for both the adults and young.

While the starlings were undergoing the rapid moult into winter plumage, Correia reports that their yellow beaks turned dark. At Pico, during late July, these birds were busy searching for figs.

***Fringilla cœlebs moreletti* Pucheran**

*Fringilla Moreletti* PUCHERAN, 1859, Rev. et Mag. de Zool., pp. 409–412, Pl. XVI (Azores).

NATIVE NAME.—Tentilhão.

Fayal, April 23, 26, May 2, 4, 7, 9, 13, June 27, September 5, 7, 8; Pico, July 12, 15, 21, 30, August 12, 19; San Miguel, November 10, 11, 15, 17, 1927.

Specimens with enlarged gonads were taken from early May until mid-July; fledglings between June 27 and September 7. The post-nuptial moult is in active process during September, and November specimens are in brilliantly fresh plumage.

We have compared these birds with examples of *Fringilla cœlebs maderenis*, collected at Madeira by Mr. Jesse Metcalf, and find the subtle but clear differences noted by Hartert, particularly those showing in the pattern of the outer rectrices.

The collection includes a set of three eggs, which were slightly incubated, taken at Flamengos, Fayal, May 14. The nest, which was apparently not preserved, was in a small tree and was made of dry grass, lined with hair and feathers. The eggs are pale bluish, with indistinct vinaceous blotches and with small spots and vermiform marks of a maroon hue. They measure  $21 \times 16$ ,  $21 \times 15.7$ ,  $21 \times 15.7$  mm.

***Pyrrhula pyrrhula murina* Godman**

*Pyrrhula murina* GODMAN, 1866, Ibis, p. 97, Pl. III (San Miguel, Azores).

NATIVE NAME.—Priôlo.

San Miguel, November 11, 15, 18, 1927.

The Azorian bullfinch may be regarded as a "hen-feathered" race, the male being without any reddish coloration, thus resembling the female of the typical form, except that it is more brownish, and has a light gray instead of a white rump-spot. The wings of our four males measure 88–89.5 mm.; of one female, 86.

While the two races of bullfinch that inhabit Europe show marked sexual difference in color, the reddish wash on the breast is very variable,

often wanting, in males of the Japanese representative, *griseiventris*. The throat and cheeks in this form, however, always retain their rosy color in the male. A closer parallelism to *murina* is exhibited by *cassini* of Central Asia, in which the male is wholly without red or pink, but the rump-spot remains white. Farther east, in Kamtschatka, lives still another race with red-breasted males like those of Europe.

If, as in domestic fowls, the bright colors of males can be inhibited by internal secretions, which in some races are produced only in females, there would seem to be a tendency among certain races of bullfinches for such a secretion to occur also in males. Hen-feathering of this sort is known to be hereditary, and the Azores would furnish the necessary isolation for the development of a peculiar race. On the other hand, the European bullfinch is a bird among which at least three gynandromorphs have been found, with male coloration on one side of the body (usually the right) and female garb on the other. This would seem to indicate that the colors are determined by the chromosomal content of the cells of the skin, and not influenced by a hormone.<sup>1</sup>

When Correia landed at Ponta Delgada, San Miguel, in early November, he was assured that there was no chance of collecting bullfinches. The birds have been persistently shot because of their blossoming propensities in the orchards, and none had been reported for two years or more. While still supposed to exist, the bullfinches were said to be restricted to the dense forest of the uplands except during part of the spring season.

However, on November 8 he went to Furnas, twenty-seven miles distant from the port. The region lies in a valley surrounded by steep hills, with a small lake and mineral springs of various flavors and temperatures. The commonest birds proved to be the blackbird, chaffinch, starling, robin, wagtail, blackcap, and kinglet, with a few wood pigeons in the taller growth of the slopes.

On the morning of November 10 the weather was clear, after rain during the whole night. Correia asked some of the inhabitants as to where he might find the priôlos, but their answers proved unsatisfactory. He was told that the birds were formerly seen in spring, but that during the winter they retired to the higher forests and were difficult to locate. He was at the point of losing hope when one man asked him what reward would be paid for each priôlo that he might discover for

<sup>1</sup>The condition of reproductive organs in such gynandromorphs has been described by R. Neunzig, 1924, *Gefederte Welt*, LIII, pp. 93, 246, 247, and J. W. Harms, 1926, 'Körper und Keimzellen,' pp. 431-433, Figs. 185, 186. Castration and the introduction of an ovary failed to alter the plumage of normal red-breasted males. See V. A. Hachlow, 1927, *Archiv f. Entwicklungsmechanik*, CX, pp. 279-301.

the collector. One dollar per bird was offered but the man demanded two, so Correia went off to try his luck alone. He wandered over the hills and through the woods, into orchards and gardens, seeing many birds, but not those sought, so he returned and hunted up the resident who had agreed to find the prize.

On November 11 he and his guide repaired to the forest along the lake known as Lagoa das Furnas. This is about 400 feet above the level of the valley; there is no flat land about it but only steep hillsides covered with large trees. At a point on the edge of the lake, where a charming little stone chapel stands, the guide began to call for *priôlos* by making short whistles every two seconds. Suddenly he announced the approach of a bird, which came presently within Correia's ken and answered each call. The victim hopped from tree to tree to within ten feet. Two more hours of patient calling was finally answered by another bird from a distance, and within four minutes this one also approached within collecting range.

The above episode took place partly during heavy showers of rain. Next day, November 12, Correia went to the same region and whistled for himself through equally heavy downpours, but without attracting any of the bullfinches into ambush.

On November 13 and 14 it rained hard all day. On the 15th he once more took his guide, who immediately called up a bullfinch at the usual place. The guide then said that as the *priôlos* usually travel in pairs he would have another within five minutes, which turned out according to prophecy. The final specimen was decoyed in the same manner on November 16. Four of the five are males.

Many of the people of Furnas stated that they had not seen a *priôlo* for ten years, and some of the younger folk, who knew the bird by reputation, asked to examine Correia's specimens.

### ***Serinus canaria canaria* (Linnæus)**

*Fringilla canaria* LINNÆUS, 1758, 'Syst. Nat.,' 10th Edit., I, p. 181 (Canary Islands).

NATIVE NAME.—Canario.

Fayal, April 26, May 4, 6, 7, 9, June 27, July 1; Pico, July 8, 14, 15, 16, 21, 22, 30, August 18, 19; Terceira, September 28, October 11, 12, December 6; San Miguel, November 21, 1927.

Fledglings were taken by July 1. November adults from San Miguel are in recently renewed plumage.

A nest taken at Pico on August 19, site not recorded, is woven of grass and rootlets, with a heavy lining of what appears to be thistle-down. The bowl is about 6 cm. in diameter.

***Carduelis carduelis parva* Tschusi**

*Carduelis carduelis parva* TSCHUSI, 1901, Orn. Monatsber., p. 129 (Madeira).

NATIVE NAME.—Pintasilgo.

Terceira, October 11, 24, 28, December 3, 7, 8, 1927.

Noted in large flocks of migrants at Terceira during the latter part of October. They belong, however, to the resident race, which is smaller and darker, duller brown on the back, than either the British or the continental European races. Wings of four males in the present collection measure 72–76 mm.; of four females, likewise, 72–76. It is supposed that the goldfinch was introduced into the Azores from Madeira, the same race being found there and in the western Canaries.

