

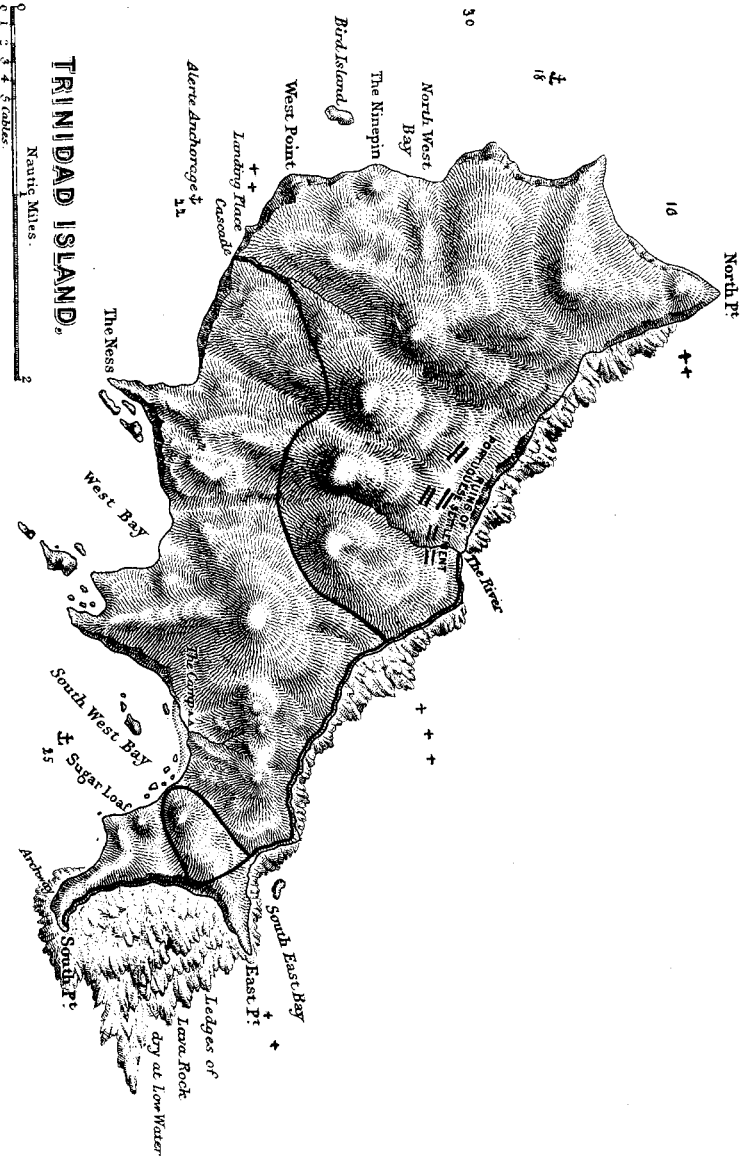
THE BIRD LIFE OF TRINIDAD ISLET.

BY ROBERT CUSHMAN MURPHY.

Plates XXIII-XXV.

EAST of the coast of Espirito Santo some seven hundred miles lies a fairy island. Alone in the tropical ocean, piled up in peaks as fantastic as tossing waves, and overhung with pennons of torn clouds which seem to flutter from the summits, Trinidad has exercised a strange charm upon the imaginations of all who have but seen its silhouette on the borderline of sky and sea. During four centuries it has been a landmark in the trade routes of the South Atlantic, often sought by sailing vessels as a check upon their nautical reckonings. Before the days of steamers it was a veritable signpost at a crossroads of the sea, yet few indeed are the travelers who have set foot upon its crumbling shore. Pirates in the old times, whalers, treasure-seeking adventurers, ill-fated colonists, in their turn have come to Trinidad and gone; the island seems unflinching to forbid the encroachment of permanent habitation. None who have felt its presence can speak or think of it unstirred; even the prosaic pages of the 'South Atlantic Pilot' become alluring at the account of Trinidad, and the Director of the British Antarctic Expedition of 1901, though he surveyed the islet with the critical eye of science, was deeply impressed by "the dream-like appearance of this remarkable cluster of volcanic peaks in the early tropical dawn."

Trinidad was discovered early in the sixteenth century by the Portuguese admiral, Tristan da Cunha; consequently it appears on most old maps of the western hemisphere. Captain Edmund Halley, afterwards Astronomer Royal to George the First of England, and of popular fame through his comet, visited the island in April, 1700, while conducting a voyage for the study of magnetic variation. Halley landed on April 15 in search of water, which he soon found. On the seventeenth he moored his vessel, the *Paramore Pink*, off the western end, with "the high steep Rock like a Ninepin E. S. E. Whilst the Longboat brought more water on



board," he writes, "I went ashore and put some Goats and Hogs on the Island for Breed, as also a pair of Guiney Hens I carried from St. Helena. And I took possession of the Island in his Majesty's name, as knowing it to be granted by the King's Letters Patents, leaving the Union Flag flying.

"The Water of the Island being very fine and good I empty'd my Cisterns of their brackish St. Helena Water," continues the astronomer's account. "The Watering place we used was a little to the southward of the high Steep Rock, where the water run all the time we were there with a plentiful stream, but the Shoar being very rocky much endammaged our Cask."

Halley's goats and hogs were destined to have an overwhelming effect upon Trinidad, a subject to which I shall return below. The astronomer's claim to the island did not prevent a subsequent Portuguese attempt at colonization. In 1781 the English likewise tried to found a settlement, an enterprise terminated within three months, presumably by shortage of water. The ownership remained in doubt until 1895, when a dispute between Great Britain and Brazil regarding the possession of Trinidad as a possible coaling station, was decided by an international court in favor of Brazil, on the merits of original discovery by the Portuguese.

Narratives of brief calls at Trinidad may be found among many worm-eaten volumes of old voyages. For information regarding pirates and buried gold Mr. Knight's 'Cruise of the *Alerte*' should be consulted. The indomitable British sea-fighter and novelist, Captain Marryat, once crossed the island's mysterious mountains, and afterwards incorporated his experiences in his first novel, 'Frank Mildmay.' Whalers, which differ from merchantmen in that they are never in a hurry, still stop at Trinidad and lie off-shore while their crews lower boats and spend the day fishing in the prolific coast waters. Among other visitors have been naturalists of passing scientific expeditions, whenever they may have found the sea sufficiently quiet to permit landing.

Trinidad lies in latitude 20° 30' S., longitude 29° 22' W., at the edge of the southeast trade-winds. Its width is hardly more than a mile and a quarter, a distance great enough, however, to require at least one day's laborious and perilous journeying over the single practicable mountain route. According to Prior, *l. c.*, rock

samples from Trinidad, "as well as many of the geological features of the island, such as the remarkable peaks of phonolite associated with basaltic lavas, suggest analogies between Trinidad and the Island of Fernando Noronha, off the coast of Brazil, a thousand miles to the north, so that it appears possible that the two islands owe their origin to a very similar, if not contemporaneous, volcanic outbreak." Over all the island the brittle, standing rock has assumed grotesque forms through extreme weathering. In the words of Mr. Knight, Trinidad "is rotten throughout, its substance has been disintegrated by volcanic fires and by the action of water, so that it is everywhere tumbling to pieces." Tremendous physiographic changes are brought about by the collapsing of outworn mountain sides. One of these changes is vividly described by Knight in the 'Cruise of the *Alerte*.' The author, with a companion, was vainly searching for a ravine through which he had descended to the northeastern coast of Trinidad nine years before. Eventually he found the way, which, however, was no longer a ravine. "The mountain on which we stood," he writes, "had fallen away, leaving a precipitous step some fifty or sixty feet in height, and from this step there sloped down to a depth, I should say, of quite 1,500 feet a great landslide of broken rocks, the *débris* of the fallen mountain. This landslide appeared to have taken place not long since. It was composed of rocks of all sizes and shapes, almost coal black, piled one on the other at so steep an angle that it was extraordinary how the mass held together and did not topple over. It was indeed in places more like an artificial wall of rough stones on a gigantic scale than a landslide."

Rainfall is rather plentiful at Trinidad, but the porous soil sucks up much of the water of the springs before it can flow to the sea, and recurring drought is one of the chief objections to human colonization. Another serious handicap is the island's boisterous shore, for the waves render landing almost continuously impossible during the winter months of June, July, and August, as well as during a large proportion of the remainder of the year. Southwest winds raise the heaviest seas, but the effects of far away *pamperos* are frequently manifested by huge breakers even when the weather is locally serene. During northerly winds there is a good lee, and relatively quiet water, along the southwestern coast. The wind-

ward beach of Trinidad is perpetually strewn with wreckage, for many a fine square-rigger, since the days of treasure-ships and slave-traders, has been lost among the outlying reefs. During favorable weather vessels may obtain drinking water at two places, on opposite sides of the island — the Cascade, and the river by the old Portuguese settlement. Explicit directions for watering are given by Captain Amasa Delano.

Probably the first naturalist to set foot upon Trinidad was the veteran botanist, Sir Joseph Hooker, in 1839, during the voyage of the *Erebus* and *Terror*. The vegetation, like most insular floras, comprises rather few species. Moreover, according to Hemsley, the flora is of recent origin as compared with that of St. Helena. Less than twenty species of vascular plants are known, of which several are ferns. The tree-fern, so conspicuous on the plateaus and higher slopes, is an endemic species, *Cyathea Copelandi*. The lower limit of its zone of growth was determined by the naturalists of the *Discovery* to be at an altitude of about eleven hundred feet. There are a few sparse grasses and sedges, a widespread, tropical, tangling bean (*Canavalia*), a sage, and several mosses and lichens including a tree-infesting *Usnea*. But the most striking element in the vegetation of Trinidad is its great groves of dead trees of the genus *Caesalpinia*. Records of the old mariners say that the island was once heavily forested, even to the pinnacles of the Sugarloaf Mountain and the Ninepin. All its trees, however, have long since been dead, the last mention of living forests harking back to the eighteenth century. Captain Marryat, whose picturesque and truthful account of Trinidad appeared in his first work of fiction in 1829, relates the following observations regarding a valley among the island's hills:

“Here a wonderful and most melancholy phenomenon arrested our attention. Thousands and thousands of trees covered the valley, each of them about thirty feet high; but every tree was dead, and extended its leafless boughs to another — a forest of desolation, as if nature had at some particular moment ceased to vegetate! There was no underwood or grass. On the lowest of the dead boughs, the gannets, and other sea-birds, had built their nests in numbers uncountable. Their tameness, as Cowper says, ‘was shocking to me.’ So unaccustomed did they seem to man

that the mothers, brooding over their young, only opened their beaks in a menacing attitude at us, as we passed by them.

"How to account satisfactorily for the simultaneous destruction of this vast forest of trees was very difficult: there was no want of rich earth for nourishment of the roots. The most probable cause appeared to me, a sudden and continued eruption of sulphuric effluvia from the volcano; or else, by some unusually heavy gale of wind or hurricane, the trees had been drenched with salt water to their roots."

The wood of these gnarled trees is hard and imperishable, so that a similar condition obtains today, excepting that most of the trunks have fallen to earth. Knight's account is not unlike that of Captain Marryat; his conclusion also is the same:

"The mountain slopes were thickly covered with dead wood — wood, too, that had evidently long since been dead; some of these leafless trunks were prostrate, some still stood up as they had grown. . . . When we afterwards discovered that over the whole of this extensive island, from the beach up to the summit of the highest mountain — at the bottom and on the slopes of every now barren ravine, on whose loose-rolling stones no vegetation could possibly take root — these dead trees were strewed as closely as it is possible for trees to grow; and when we further perceived that they all seemed to have died at one and the same time, as if plague-struck, and that no single live specimen, young or old, was to be found anywhere — our amazement was increased.

" . . . Looking at the rotten, broken-up condition of the rock, and the nature of the soil, where there is a soil — a loose powder, not consolidated like earth, but having the appearance of fallen volcanic ash — I could not help imagining that some great eruption had brought about all this desolation; . . . I think this theory a more probable one than that of a long drought, a not very likely contingency in this rather rainy region."

Admitting a general impoverishment of vegetation, Copeland has suggested a still more probable agency than recent volcanic action. He asks whether the goats, introduced by Halley in 1700, may not have destroyed the trees of Trinidad, as happened, according to Darwin, to the trees of St. Helena. It has been pointed out that such a theory would involve both a change of climate and

the extermination of the goats themselves, a theory in harmony with the facts, for water is undoubtedly scarcer at Trinidad than a hundred years ago, while the last record of the goats is that of Sir James Clark Ross, who saw one in 1839. A third of a century earlier, in 1803, Captain Delano saw "plenty of goats and hogs," and "some cats" (the only record).

Other mammals of the island are mice, possibly introduced. Excepting birds, the remaining vertebrates are sea turtles, which lay their eggs in the warm sand of the beaches, and sea snakes,¹ reported by Knight as inhabiting the tidal pools. Crabs (*Gecarcinus lagostomus*) are by far the most abundant terrestrial animals, swarming over the whole island, their burrows everywhere undermining the soil. These saffron-colored crustaceans made a profound impression upon the imagination of Mr. Knight, who soon found that he could not lie down to sleep without being attacked by hordes of the creatures, which, he writes, "might well be the restless spirits of the pirates themselves, for they are indeed more ugly and evil, and generally more diabolical-looking than the bloodiest pirate who ever lived." At night the only resource, he states, was to rise and slaughter a large number of the crabs, when the others would devour "their dead brethren, making a merry crackling noise all round as they pulled the joints asunder and opened the shells." The common tropical rock crab, *Grapsus maculatus*, is found along the coastline of the island. Other living creatures collected or mentioned by various visitors are earth-worms, flies, roaches, ants, earwigs, moths, dragon-flies, and five species of spiders.

About sunset of April 7, 1913, I sighted Trinidad, forty miles to the northward, from the masthead of the whaler *Daisy*. Early next morning the gray pile lay right in our path, with the rocks of Martin Vas barely visible in the east. The order for lowering the boats was given; we left the *Daisy* in the offing, and pulled ahead, fired with enthusiasm, toward the white-lined coast. Three Man-o'-war Birds were winding in and out between the topgallant

¹ Perhaps, however, Knight's "sea snakes" are morays. Copeland, *l. c.*, p. 276, records the capture, "in den Wassertümpeln des Riffs," of "einen seltsam gefleckten Aal, weiss und schwarz." The description fits the Atlantic spotted moray (*Gymnothorax*).

masts of the brig. An inquisitive Booby flew between two of the oarsmen in our whaleboat, and the Noddies (*Anous*) were scarcely less familiar. The White Terns (*Gygis*), and the several kinds of native petrels, were also very numerous, but they kept their distance, through indifference rather than fear. During the row toward shore the thunder of surf rang louder and louder in our ears, the sound rebounding from many rocky walls. The air was perfectly calm, but a southeasterly ground swell heaped up a tremendous surge of waters on the ironbound coast, which was formed either of the precipitous cliffs themselves, or of beaches about a yard wide completely strewn with sharp blocks of the mountain. The line of breaking water was, nevertheless, so narrow that at some places we could safely come within twenty feet of shore.

We approached the island at the Ness (*cf.* map), a peninsula of somewhat columnar rock which suggests a bit of the Giants' Causeway. From here we skirted the western end, ultimately rounding North Point, but nowhere finding a landing place. Whenever the whaleboat's prow was pushed close to the rock in a sheltered angle, the whole craft rose and fell in such a dizzy and appalling manner that several of our seasoned whalers became seasick.

From the brig and the whaleboat I was able to enjoy a good view of the island's skyline and general topography through its length of four or five miles. At the southeastern end is a ridge-roofed promontory of brick-red volcanic tufa, terminating in the cliff of South Point, which is pierced by an archway. Knight has aptly styled this headland "Noah's Ark." According to the 'South Atlantic Pilot,' the surf sometimes breaks two hundred feet above its base. Overtowering Noah's Ark is the Sugarloaf (1160 ft.), which greatly resembles the conical mount of the same name at Rio Janeiro. The rock is gray phonolite, so worn and grottoed by pluvial action that its texture is like the cut surface of a Swiss cheese. Under this mount, says tradition, "there was an immense treasure buried, consisting principally of gold and silver plate and ornaments, the plunder of Peruvian churches which certain pirates had concealed there in the year 1821." Northwest of the Sugarloaf lies a green valley, with several clumps of shrubs. The mate of the *Daisy* told me that there is a cluster of stone-

marked graves on the northern side of the valley. The highest point of Trinidad, 2020 feet on the Admiralty chart but 3000 according to the 'South Atlantic Pilot,' is near the center of the island. The summits of the ridges are more than serrate, being a succession of needle like pinnacles. At the western end of the island stands one of the most remarkable rock structures in the world, the Ninepin of Halley, known also as the Monument, and the Priest, a cylindrical tower of dark gray stone, doubtless a phonolitic dike, rising from the ocean to a height of nearly nine hundred feet. In common with all the bare steep slopes of this isle, the surface of the Ninepin is pitted and undercut into designs like arabesques. In outline and proportion the great column may be compared with the two distal phalanges of a man's index finger. Leaning slightly less than the Tower of Pisa, planned on the grandest scale of Nature's architecture, its utterly inaccessible wall furnishes nesting chambers for tens of thousands of feathered sprites, which sit within their niches like saints about a cathedral spire. No sight had ever seemed so impressive as I gazed from the small boat straight upward to the Ninepin's lofty summit, enveloped in a cloud of midge like birds.

Since landing was out of the question, we began fishing with considerable success off the West Point, just outside the line of breaking sea. The bottom was very rocky, varying in depth from three to seven fathoms. Many of the captured bottom fishes were brilliantly colored. The largest species, excepting sharks, was a red-spotted garupa (*Epinephalus?*), in several instances over four feet long and weighing fifty or sixty pounds. Several kinds of trigger-fish (*Balistidæ*) proved abundant. Here, as at Fernando Noronha, we lost many of our prizes because of sharks, the lines often coming inboard with nothing but fishes' heads on the hooks. Even one of our largest garupas was nipped in half. We succeeded in hooking and harpooning a number of cat sharks (*Ginglymostoma*), the ugly mouths of which harbored curious, extensible leeches. Larger sharks were about the brig all day, and a Booby which was shot and wounded so that it fell into the water, first had its legs bitten off, and was then devoured as one morsel. At the surface of the sea near shore were schools of needle-gars (*Hemirhamphus*). The mandible of this small fish is long, resembling the beak of a

swordfish, but the upper jaw is very short. They have an especially curious appearance when they open their mouths widely to feed, the seemingly useless bill merely passing beneath a bit of food. Our sailors threw scraps of fat into the water alongside the whaleboat, and captured many of the needle-gars with their hands. Altogether we caught approximately two hundred fishes, representing nine species, of which two have proved new to science. Seventeen species are known from Trinidad, but the whole number of native fishes is doubtless far greater, and the abundance of individuals almost beyond exaggeration.

While we were fishing, a number of flat, triangular flies, *Pseudofersia spinifera*, a species which lives as a parasite among the feathers of the Man-o'-war Bird, flew into the boat. They scuttled sidewise like crabs, adroitly dodging capture, and seemed bent on getting on the *under* side of whatever they alighted upon, whether a gunstock, one's hand, or a thwart of the boat. These flies were the only insects we saw.

Birds were about in countless hosts, filling the air and covering the rocks. The Noddies (*Anous stolidus*) were incredibly confident and curious, hovering round our heads, even alighting upon them, and peering into our faces so closely that one had to look at them cross-eyed. It was the simplest matter to catch them in the hand as they fluttered among us. Four of them I banded with aluminum rings of the American Bird Banding Association—numbers 7941, 7943, 7945, 7947; may their wearers once again entrust themselves within the clutches of a naturalist! But the Noddies were not one whit more abundant than the exquisite Love Birds (*Gygis*). At Trinidad there are perhaps more of these terns than anywhere else in the world. They were flying mostly in pairs, and pairs also were sitting together in many rocky niches. Most delicate and wraith like of birds are these White Terns; when they fly against the glare transmitted from a bright sky, the dark line of their wing bones is projected like an x-ray shadow through the milk-white feathers.

Boobies soared among the pinnacles a thousand feet above us. Man-o'-war Birds, flying overhead, seemed all head, wings, and tail. There are two species at Trinidad, and both were more interested in the brig offshore than in our tiny whaleboats. The

Man-o'-war Birds are notorious pirates in their feeding habits, but I saw a troop of the smaller species (*Fregata ariel*) fishing for themselves. Half a dozen of them hovered in a row over a school of small surface fish, and faced in a direction opposite to that in which the fish were moving. While the birds poised close over the water they beat their big wings slowly. Then at the right moment they struck downward, swinging their long bills like scimitars back under their bodies, the hooked tip seizing a fish from the rear. They seemed to catch three or four a minute, and yet made no commotion among the moving school of their victims. One Man-o'-war Bird was caught on a fishhook from the *Daisy*.

Trinidad's endemic petrels, of the genus *Æstrelata*, were as numberless as the Noddies. Arminjon's Petrel, which was nidificating or perhaps only resting, in water-worn cells of the rock, made up the bulk of these birds. They frequently quarreled with one another in air, chattering not unlike terns. They were perfectly fearless, but disinterested. Specimens shot had not long since bred, for the abdomens were bare. The black species, *Æ. trinitatis*, seemed somewhat less common. During the forenoon I had shot one of the latter with the right barrel of my gun, in the vicinity of two small rocks near the Ninepin, when a very white petrel flew swiftly toward us from the sea. Intuitively, in that momentary glimpse, I recognized a bird with which I was not familiar. A fortunate, long shot, straight up from the shoulder, brought it hurtling to the water, and we reached it sooner than the sharks. It proved to be a species new to science, more beautiful than all its congeners, clad in a black-flecked cloak like ermine. I have named it *Æstrelata chionophara*, the Snowy-mantled Petrel.

All the birds that we saw were, of course, sea birds — none others have been found at Trinidad. But through the whole day, while our little boat skirted the seething edge of ocean, I gazed longingly at the tree-ferns far above, and could not help thinking that there may have been unknown land birds there, among the spires of the fascinating, unattainable mountains.

Annotated List of Birds.

1. **Numida (meleagris?)** Linné. Nothing further has ever been heard of Halley's "Guiney Hens" beyond the fact that he freed a pair on Trinidad in April, 1700. The same lack of history applies to a domestic cock and two hens brought from England by Sir James Clark Ross in 1839, and placed ashore "with a view to add somewhat to the stock of useful creatures."

2. **Puffinus gravis** (O'Reilly).? A large white-breasted shearwater, believed to have been of this species, was seen by Nicoll (Three Voyages, p. 61) within half a mile of shore at the islets of Martin Vas, twenty-six miles east of Trinidad, on January 5, 1906.

Puffinus gravis occurs as a rover all over the tropical and south temperate Atlantic. It has been collected by the writer, during the month of March, due south of Trinidad in latitude 39° S. It has been suggested that the species may breed on the island of Tristan da Cunha or one of its outliers.

3-5. **Æstrelata arminjoniana** Gigl. & Salvad. *Æstrelata arminjoniana*, Gigl. & Salvad., Ibis, 1869, p. 62. Giglioli, Distr. Fauna Vertebr. Oceano, 1870, p. 42. *Æstrelata mollis*, Saunders, Proc. Zool. Soc., 1880, p. 164. *Æstrelata arminjoniana*, Salvin in Rowley's Ornith. Misc., Vol. I, 1876, pp. 234, 252, pl. 31. Salvin, Cat. B. XXV, p. 413. Lowe, Bull. B. O. C., XIX, p. 98. Wilson, Ibis, 1904, p. 213. Sharpe, Ibis, 1904, p. 215. Nicoll, Bull. B. O. C., XVI, p. 102; Ibis, 1904, p. 41. Godman, Monogr. of Petrels, 1908, p. 229, pl. 65. *Æstrelata armingoniana*, Nicoll, Ibis, 1906, p. 671. *Æstrelata wilsoni*, Sharpe, Ibis, 1904, p. 216. Nicoll, Ibis, 1906, p. 671; Bull. B. O. C., XVI, p. 103. *Æstrelata alba*, Brabourne & Chubb, Birds So. America, I, 1912, p. 31.

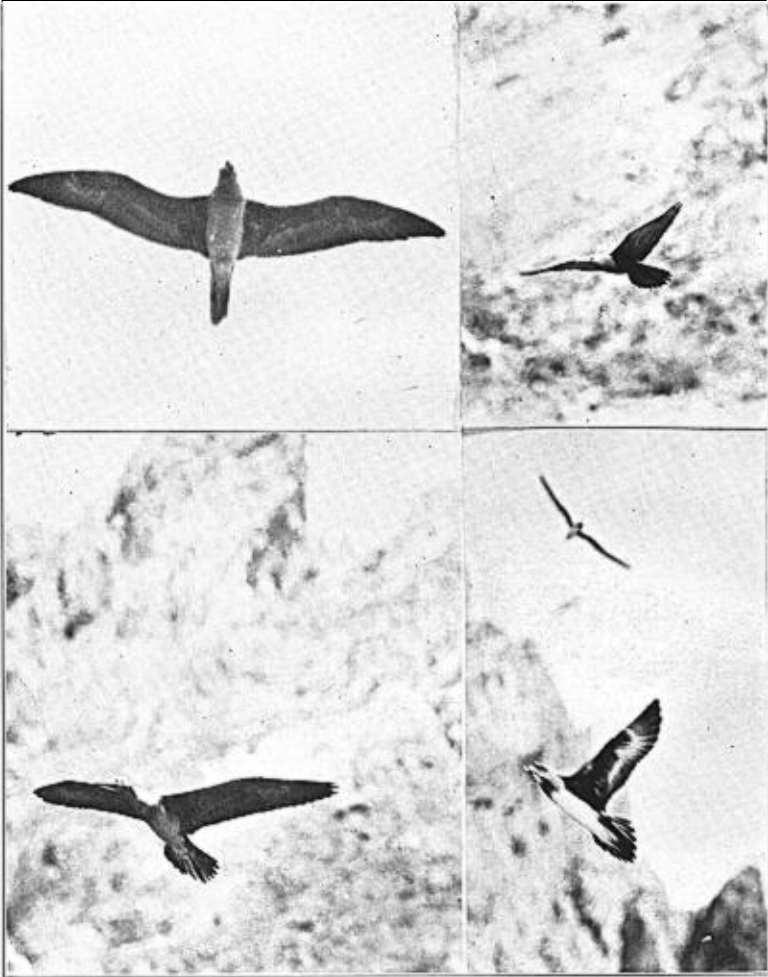
Æstrelata trinitatis Gigl. & Salvad. *Æstrelata trinitatis*, Gigl. & Salvad., Ibis, 1869, p. 65. *Pterodroma trinitatis*, Gigl. Distr. Fauna Vertebr. Oceano, 1870, p. 40. *Æstrelata trinitatis*, Salvin in Rowley's Ornith. Misc., I, 1876, p. 253, pl. 32; Cat. B. XXV, p. 413. Wilson, Ibis, 1904, p. 213. Sharpe, Ibis, 1904, p. 215. Nicoll, Bull. B. O. C., XVI, p. 103; Ibis, 1906, p. 671. Godman, Monogr. of Petrels, 1908, p. 232, pl. 66.

Æstrelata chionophara Murphy. *Æstrelata chionophara*, Murphy, Auk, XXXI, 1914, p. 12, pl. 2.

Nine specimens of petrels were collected at Trinidad, of which five are referable to the species *arminjoniana*, three to *trinitatis*, while the other has been made the type of a new species, *chionophara*. It is remarkable that no example of the gray-breasted phase of *arminjoniana*, the phase described by Dr. Sharpe as *Æstrelata wilsoni*, was either collected or observed during our day about the island.

These three species of closely related, endemic petrels, are the only Tubinares known from Trinidad, since the record of *Æstrelata mollis* (Saunders, P. Z. S., l. c.) was based upon an incorrect identification.

Brabourne and Chubb, l. c., perhaps following a suggestion made in Rowley's Ornithological Miscellany, have synonymized *arminjoniana* with *Æstrelata alba* of Gmelin. In justification of this step the authors allege



ON LEFT; IMMATURE BOOBIES, PROBABLY *Sula piscator*.
ON RIGHT; UPPER, NODDY (*Anous stolidus*); LOWER, TRINIDAD PETREL
(*Estrelata arminjonian*).

"Rio Plata" to be the type locality given by Gmelin, Syst. Nat. I, 1789, p. 565. In this citation an error has evidently been made, for Gmelin, nowhere mentioning Rio Plata, simply follows Latham, Synopsis, III, 1785, p. 400, where it is stated that the species "Inhabits *Turtle* and *Christmas Islands*." Pending further light on the subject, *Æ. alba* must therefore continue to stand as a doubtful synonym of *Æ. neglecta*.

We first saw *Æstelata arminjoniana* on April 4, 1913, in latitude 25° S., longitude 30° 40' W., nearly four degrees south of Trinidad. This species became increasingly common on the fifth, sixth, and seventh of the month, as we approached its headquarters. *Æ. trinitatis* was seen only on April 8, in the immediate vicinity of the island, and neither bird was noted again, although I kept a sharp lookout for several days after we had proceeded on our northward journey.

The validity of the species *trinitatis* has long been questioned, Salvin (Cat. B. Brit. Mus.) and others considering it merely a dark form of *arminjoniana*. It has lately been noticed by both Wilson and Nicoll that *trinitatis* breeds at a higher altitude on Trinidad than *arminjoniana*, and this fact, together with the apparently constant color differences of plumage and feet, is the present warrant for granting specific distinction to the two birds. The evolution of several well-differentiated representatives of one circumscribed section of a genus, whether they be true species or merely color phases, is an interesting and rather common phenomenon in the genus *Æstelata* (*viz. jamaicensis* and *neglecta*), and indeed among Tubinares in general. As regards the relationships of the petrels inhabiting the small oceanic island of Trinidad, it is not improbable that the parti-colored forms (*arminjoniana*, "*wilsoni*," *chionophara*) are of relatively recent origin, and that this small group of birds is still specifically unstable. Such a hypothesis can at least be made to fit the facts, although a final decision must be reserved until a large series of specimens, representing every stage of growth, can be studied. Assuming the uniformly colored *trinitatis* to be nearest the parental stem, I find that I can formulate the following progressive arrangement, partly on the basis of my own specimens, partly on published information:

- a. Downy young of all the species, so far as known, dark gray.
- b. *trinitatis*, immature. Bill black; tarsi and feet black; plumage uniformly blackish-brown; concealed portions of the feathers light gray with dark shafts.
- c. *trinitatis*, adult. The same, except that the concealed portions of the feathers are pure white, including the shafts.
- d. *arminjoniana*, immature (dark "*wilsoni*" phase). Bill black; tarsi and basal half of the toes very dark brown" (Nicoll), distal half of toes black; dorsal plumage like that of *trinitatis*; breast dark gray.
- e. *arminjoniana*, older than the last but not fully mature — or possibly the mature bird in fresh plumage? (light "*wilsoni*" phase). Bill black; tarsi, and basal half of web and two inner toes, flesh color; distal half of foot black; breast more or less dark, sometimes showing only on the ex-

treme tips of the white feathers; a broad, mottled collar of gray crossing the throat and upper breast.

f. *arminjoniana*, fully mature. Similar to the last, but with a pure white throat, breast, and belly, the only dark on the under surface being on the collar, lower flanks, and crissum.

g. *chionophara*, adult. Bill flesh color, with a dark unguis; tarsi and feet flesh color; entire under surface, excepting lower flanks and tips of under tail-coverts, white; back white with dark feather shafts and rhomboid speckles.

In all my specimens of the three species, the dark plumage of the pileum, back, wings, and tail, is of exactly the same color, excepting that one example of *arminjoniana* is somewhat slaty on the back, owing to wear and disintegration of the feathers.

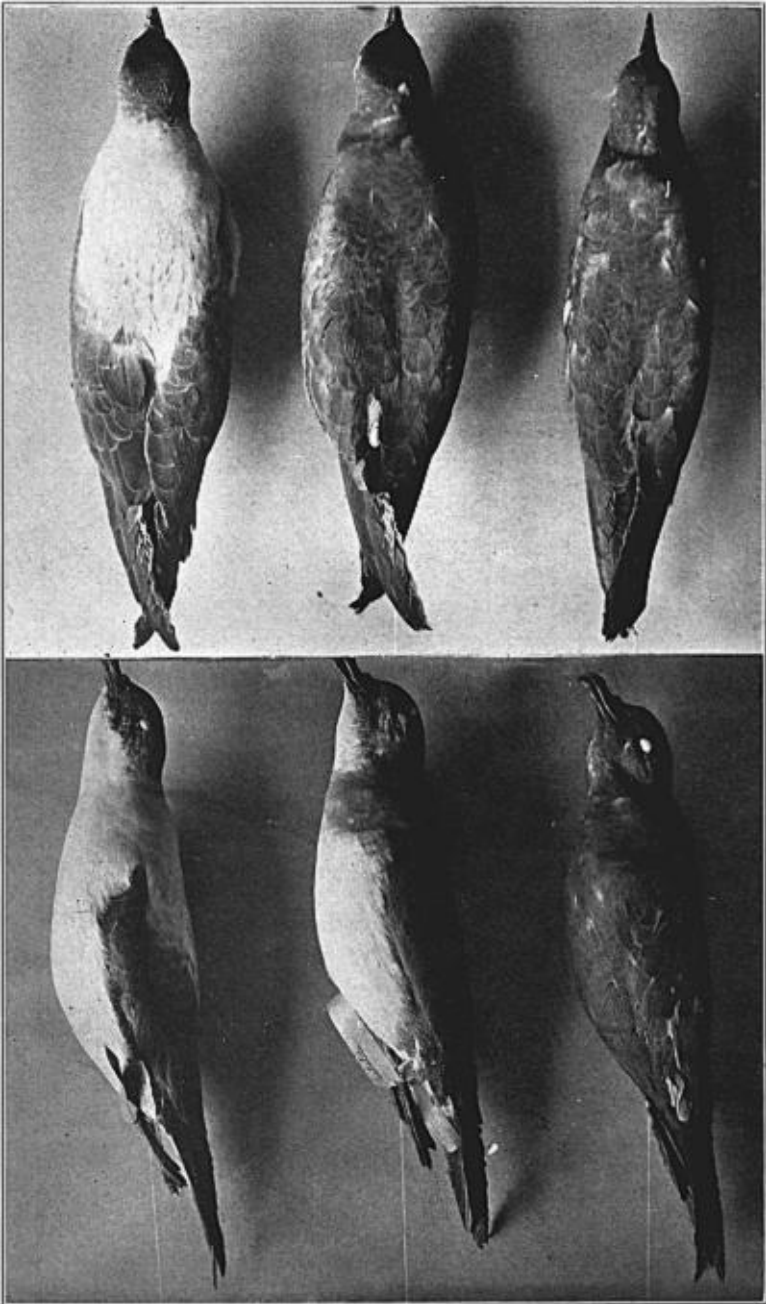
Among the five specimens of *arminjoniana* and the three of *trinitatis*, there is considerable individual variation in the depth of the bill; *chionophara* has a more slender bill than either of the others, although it is equally long. *Chionophara* has relatively the shortest tarsus and the longest foot.

Future study may yet demonstrate that *arminjoniana* and *trinitatis* are one species; possibly even *chionophara* may also be included, or may prove to be a freak. The last bird is of such striking distinction, however, that the only just course was to describe it and give it a name. Mr. Fuertes' drawing (Auk, XXXI, Pl. II) is a beautiful likeness. It also shows the bird in the correct resting position for an *Æstrelata*, and the background is quite suggestive of its habitat.

Measurements of the specimens are appended. The birds marked "breeding" had large brood-patches, and had evidently been incubating. The testes of the males, however, were non-active and partly pigmented, as might be expected in the month of April of Tubinares which breed in the southern hemisphere.

Measurements of Skins.

	Exposed culmen	Tarsus	Middle toe and claw	Wing	Tail
<i>Æ. arminjoniana</i>					
R. C. M. 1974 (in alcohol)					
1975 ♂ ad.	31	38	49.5	277	114
1977 ♂ breeding	30	37.5	48	290	113
1976 ♀ breeding	29	36	48	279	111
1978 ♀ breeding	29	37	47	268	109
Average of 4	30	37	48	279	112
<i>Æ. trinitatis</i>					
1979 ♀	30.5	35	48	276	111
1980 ♀	31	35.5	46	273	104
1981 ♀	28	34.5	45	272	108
Average of 3	30	35	46	274	108
<i>Æ. chionophara</i>					
1982 ♀ ad (type)	30	33	51	285	115



LEFT TO RIGHT: *ÆSTRELATA CHIONOPHARA* (1982), *Æ. ARMINJONIANA* (1975)
AND *Æ. TRINITATIS* (1979).

6. ***Sterna fuliginosa*** Gmelin. The Sooty Tern doubtless occurs at Trinidad, for Nicoll, 'Ibis,' 1906, p. 673, records it as inhabiting the rocks of Martin Vas.

7. ***Anous stolidus*** (Linné). *Anous stolidus*, Nicoll, Ibis, 1906, p. 670.

In spite of the enormous numbers of Noddies noted by our party at Trinidad, there seems to be no earlier specific record than that of Nicoll, who found these birds abundant, and breeding, on the occasion of his landing in January, 1906. None was collected during the visit of the *Venus* in August, 1874, and Dr. Wilson, Naturalist of the *Discovery*, reports that on September 13, 1901, the "small, black, Tern-like bird . . . was by no means frequently seen and was not familiar or inquisitive; consequently no specimen was obtained." (Ibis, 1904, p. 210.)

From these data the conclusion may be drawn that this conspicuous species is common on the rocks and over the shore waters of Trinidad only during the season of southern summer. It is not unlikely that a migration to and from distant islands, or continental coasts, occurs during the months between May and December.

Unfortunately there is only one example of the Noddy among my Trinidad specimens, an immature bird with worn contour feathers but new quills. Its measurements agree with those of specimens from Dry Tortugas, Florida.

8. ***Micranous leucocapillus*** (Gould). One record from Martin Vas Rocks, January 5, 1906. (Nicoll, Ibis, 1906, p. 673).

9. ***Gygis crawfordi*** Nicoll. *Gygis candida*, Saunders, Proc. Zool. Soc., 1880, p. 163; Cat. B. XXV, p. 151. Wilson, Ibis, 1904, p. 210. *Gygis alba*, Sharpe, Ibis, 1904, p. 217. *Gygis crawfordi*, Nicoll, Bull. B. O. C., XVI, 1906, p. 102; Ibis, 1906, p. 669. Murphy, Auk, 1915, p. 48. "Little snow-white tern," McCormick, 'Voyages,' l. c., p. 24.

This recently recognized species is the Atlantic representative of the genus, breeding on Fernando Noronha, Ascension, Trinidad, and St. Helena, but far more numerous on Trinidad than anywhere else. All the naturalists who have visited Trinidad have mentioned it. Sitting birds, eggs, and gray downy young in various stages of growth, have been observed in April, August, September, and January. Therefore this tern breeds practically throughout the year, "from sea-shore to the extreme summit of the island," laying a single beautifully marked egg on the rock, or on a stump or branch of a dead tree. According to Nicoll, the young exhibit great tenacity in clinging to their precarious perches.

10. ***Sula piscator*** (Linné). *Sula piscator*, Saunders, Proc. Zool. Soc., 1880, p. 163. Ogilvie-Grant, Cat. B. XXVI, p. 434. Nicoll, Ibis, 1906, p. 672. *Sula piscatrix*, Sharpe, Ibis, 1904, p. 214.

This Booby breeds apparently throughout the year. Excellent photographs of the bird and its nesting site have been published by both Murray and Nicoll (see references), while Knight gives an account of the nesting colonies in the ravines on the island's northeastern coast. Flying fish are known to make up part of the bird's food.

North of the Equator, on April 23, 1913, an immature Booby, probably of this same species, flew around the *Daisy* just after sunset and finally alighted on the prow of the stern whaleboat. It paid little attention to the helmsman, and was not disturbed even by the noise and riot of a rat-hunt on board. About dusk it worked its head down between the scapular feathers, its bill pointing straight down its spine, and slept soundly. The gentle motion of the ship did not disturb its balance; it swayed slightly, but rested firmly on both feet. At half past five next morning it was disturbed by a sailor entering the stern boat to get a bucket, and flew off.

Two other Boobies, *Sula cyanops* and *Sula leucogaster*, have been taken at Ascension, Fernando Noronha, or elsewhere in the tropical Atlantic, but neither species has yet been recorded from Trinidad.

11. **Fregata minor nicolli** Mathews. *Fregata aquila*, Saunders, Proc. Zool. Soc., 1880, p. 163. Ogilvie-Grant, Cat. B. XXVI, p. 447. Sharpe, Ibis, 1904, p. 215. Nicoll, Ibis, 1906, p. 673. *Fregata minor nicolli*, Mathews, Austral Avian Record, II, No. 6, 1914, p. 118. Rothschild, Novit. Zool. XXII, 1915, p. 145.

The recent study by Mathews, together with prompt corrections and elaborations by Rothschild, have split up the Man-o'-war Birds into five species, of which *F. minor* is represented by five races ranging through the Indian and western Pacific Oceans, and northward in the Atlantic to Trinidad. *Fregata aquila* is now stated by Rothschild to be confined to the type locality of Ascension Island, while the Trinidad form, based on the study of a series (apparently about twelve specimens), has been described by Mathews as a subspecies of *F. minor*.

Man-o'-war Birds, of either this or the following species, are said to nest in large numbers on the crags near the North Point of Trinidad. They have been found incubating in August, but, according to Nicoll, were not breeding in January, 1906.

12. **Fregata ariel** (Gould) **subsp.?** *Fregata ariel*, Sharpe, Ibis, 1904, p. 214. Nicoll, Ibis, 1906, p. 673. 'Atlantic form' of *Fregata ariel*, Mathews, Austral Avian Record, II, No. 6, 1914, p. 121.

Two specimens of this small species have been brought to the British Museum from Trinidad — an immature example collected by the explorers of the *Discovery*, and an adult male obtained by Nicoll.

All which I saw were immature birds. I have none in my collection, but a specimen caught on a fish hook was skinned by the captain of the *Daisy*, and is now, I believe, in the Milwaukee Museum. I find in my notebook the following incomplete description of this specimen, together with a mention of its small size: — Head and neck white; a chestnut stripe running from the mentum down the front of the neck to the upper breast, forming a solid spot on the throat; back, wings, breast, flanks, tail, upper and under tail coverts iridescent greenish-black, the feathers of the scapular and interscapular regions edged and tipped with brown; a scale like row of brown feathers with darker shafts and whitish edges, extending along the wing from wrist to elbow; belly white; feet flesh color; bill horn color;

sex undetermined. The specimen was invested with a Mallophagan parasite (*Lipeurus gracilicornis minor*) taken also from Tropic-birds (*Phaëthon lepturus*) at Fernando Noronha.

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EARLY RECORDS OF THE WILD TURKEY. V.

BY ALBERT HAZEN WRIGHT.

(*Concluded from p. 224.*)

Michigan, Wisconsin, Indiana, and Illinois.

In this area the wild turkey held its own against two centuries of civilization's advances. The first note comes in 1658-1660 when Peter Esprit Radisson (l. c. pp. 152, 212) finds in the country of the "Pontonatemicks" (Lake Superior region) "there are so many Tourkeys that the boys throw stones at them for their recreation." Of this same region, he again says "many have Turkeys." The Jesuit Relations speak of the turkey in this region in several accounts. In 1661 and 1662 they assert that in the Mississippi valley¹ "Turkeys and fowls fly in flocks as Starlings do in France." In 1669-70, Marquette, when in the Illinois country, finds² "There is fine hunting of . . . Turkeys, . . ." Along the Mississippi River, the Relations of 1672-74 say³ "Turkeys strut about, on all sides," and of Illinois River they hold that "Turkeys are found there in greater numbers than elsewhere." On Marquette's Voyage,

¹ The Jesuit Relations. . . . Vol. XLVII, p. 143.

² *ibid.*, Vol. LIV, p. 189.

³ *ibid.*, Vol. LVIII, pp. 99, 107.