

THE AUK

A QUARTERLY JOURNAL OF
ORNITHOLOGY

VOL. 74

OCTOBER, 1957

No. 4

THE AVIFAUNA OF THE TRES MARIAS ISLANDS, MEXICO

BY KENNETH E. STAGER

THE bird life of the Tres Marias Islands, off the west coast of Mexico, has been of interest to ornithologists since the time it was first brought to their attention by Andrew Jackson Grayson in 1865. Known historically since early in the 16th century, the islands were visited by early maritime explorers and served as a base for buccaneers operating along the Pacific coast of Mexico. In spite of this long period of contact by seafaring men, the islands even today are rather poorly charted and there exists a great deal of erroneous information regarding the immediate waters surrounding this insular chain.

PHYSICAL FEATURES OF THE ISLANDS

The Tres Marias lie between 21° and 22° north latitude and 106° and 107° west longitude. Stated with reference to other well known Mexican mainland points, the islands lie approximately 125 miles south southwest of Mazatlan, Sinaloa, or 65 miles west of San Blas, on the coast of Nayarit, and are considered a part of this latter state. Although named the Tres Marias, the islands total four in number and from north to south are: San Juanito, Maria Madre, Maria Magdalena, and Maria Cleofas. A relatively shallow channel separates the group from the mainland of Mexico thus distinguishing them as continental rather than oceanic islands. The islands, (see map) aligned as they are in a northwest-southeast chain, are apparently the remnants of a former single island which was approximately 50 miles in length. Prior to the period of the single island, a long peninsula evidently extended northwestward from the northern tip of Banderas Bay in the present state of Jalisco. Maria Madre, the largest island of the group, is approximately 15 miles long by 8 miles wide with a long axial ridge that rises over 2000 feet in elevation.



THREE MEXICAN RACES OF THE TROPICAL PARULA WARBLER from a painting by Don R. Eckelberry. (Top to bottom: adult males of *Parula pitayumi pulchra*, Sonora to Michoacán; *P. p. graysoni*, Socorro Id.; *P. p. insularis*, Tres Marias Is.)



FIGURE 1. Map of the Tres Marias Islands, showing highest elevation, in feet. Scale—1" = 12 miles.

North of Maria Madre lies San Juanito, the smallest of the four islands and separated from Maria Madre by a shallow and treacherous channel. San Juanito is a relatively flat island 4 miles long and 3 miles wide with its highest elevation at the extreme north end. To the southeast of Maria Madre lies Maria Magdalena, the second largest of the group. Triangular in shape, Magdalena is roughly 8 miles in diameter and rises to an elevation of around 1500 feet. Maria Cleofas, the most southeasterly of the chain, is rather circular in shape with a diameter of nearly 4 miles and an elevation of over 1000 feet

at its eastern end. Scattered offshore around the four islands are numerous jagged islets, rocks, and pinnacles.

ECOLOGICAL CONDITIONS

Nelson (1899) gives a good description of the physiography and flora of the islands so it is not necessary to elaborate on these two subjects other than to add new information and correct certain erroneous statements. Since Nelson's visit to the islands in 1898, a Mexican federal penal colony has been established on Maria Madre at the site of the original settlement on the east side of the island. There is a large henequen mill in production on the north end of Maria Madre which is operated by convicts. The other three islands are completely uninhabited except San Juanito which is sporadically occupied by groups of convicts from Maria Madre, for the purpose of harvesting the leaves of the giant *Agave* for transportation to the henequen mill on Maria Madre. Small native fishing craft from the Mexican coast frequently put in to Maria Cleofas, as there is a good anchorage on the east side of the island. Sport fishermen from the United States often stop among the islands during their voyages along the Mexican coast.

About 1903, a number of Mexican white-tailed deer (*Odocoileus virginianus*) and domestic goats were liberated on Maria Magdalena (Hanna, 1926:72). Both the deer and the goats have become well established and were noted as common during our visit in April 1955. Magdalena is well covered with vegetation, and as of the above date, the goats do not seem to have caused any appreciable damage by their browsing.

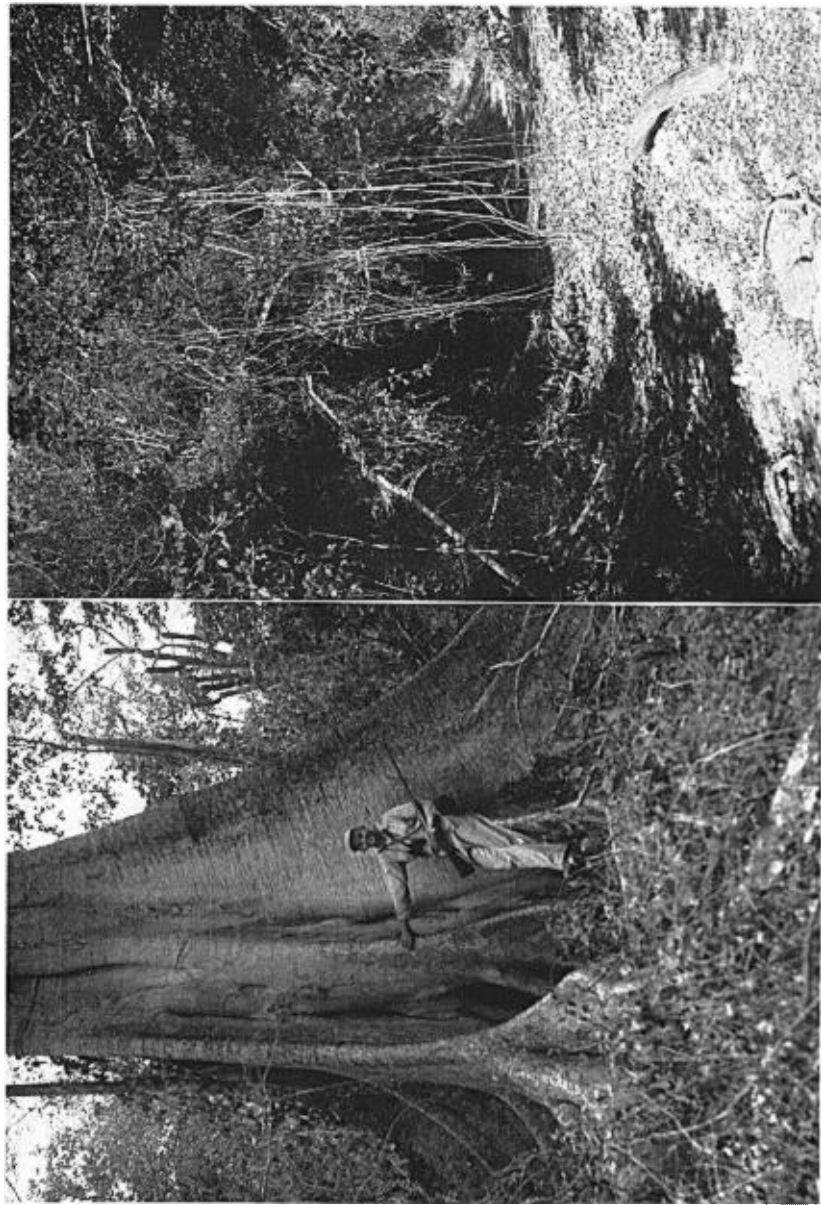
Destruction of native vegetation on the islands is most apparent on Maria Madre where, during the course of the past one hundred years, a great deal of logging has been done on the forested slopes. The most sought-after tree has been the Spanish cedar (*Cedrela*). The cultivation of agaves for henequen has also altered considerable areas of the island. At the present time there is extensive planting of introduced trees of various species. In the past there has been a relatively small amount of timbering on Maria Magdalena, but the original plant cover has not been altered to any noticeable degree. On San Juanito a network of harvest trails has been cut through the dense low scrub forest to facilitate the removal of henequen. These trails now enable a biologist to penetrate an otherwise difficult mat of vegetation. Maria Cleofas has a vegetative cover which is almost intact. Native fishermen occasionally put in at the east side of the island and remove single trees for the construction of dugout canoes.

Nelson's observations (1899) with regard to the vegetation of Maria Cleofas were obviously made from offshore as he states that the island is, "rocky and sterile and the trees are stunted and brushy." This statement is completely erroneous as our investigations revealed dense forests on the slopes and level land on the eastern side of the island. A periphery of low thorny vegetation just back of the shoreline gives the impression that the whole island is so covered. Beyond this periphery, however, which includes great patches of a large terrestrial bromeliad, a forest of considerable height is encountered. Trees of fifty feet in height are common and individuals of a large *Ficus* (Plate 19), 100 feet tall and with buttressed bases 30 feet in diameter, are to be found. This untouched climax forest can hardly be termed as "stunted and brushy." The floor of the forest is relatively open with an abundance of cycads (*Zamia* sp.) scattered throughout. Arboreal bromeliads and orchids are not uncommon.

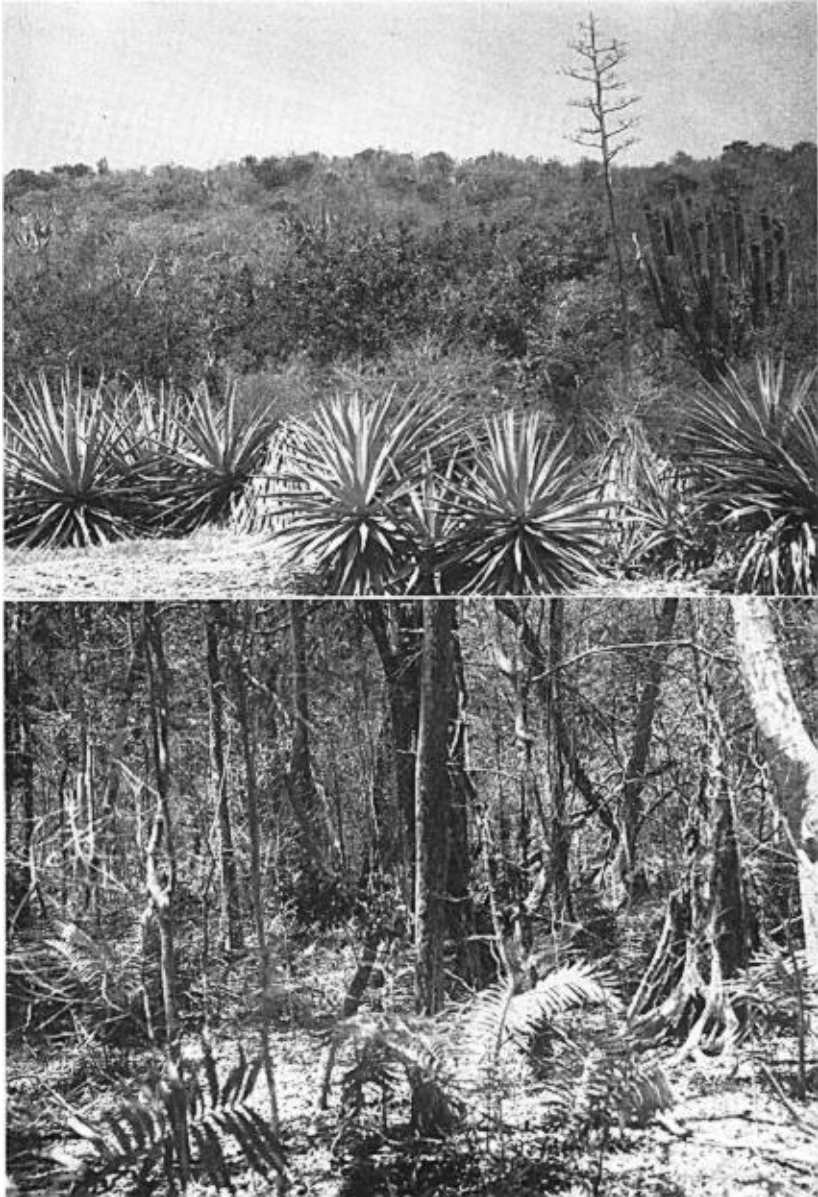
ORNITHOLOGICAL INVESTIGATIONS

Ornithological investigation of the Tres Marias began with the three visits of Andrew Jackson Grayson (1871) in 1865, 1866, and 1867. Most of Grayson's specimens are labeled either specifically "Maria Madre" or just "Tres Marias Islands" and it is difficult to determine whether he actually collected on any of the islands other than Maria Madre. Most of the material of his island collection is in the U. S. National Museum. The islands were not visited by an ornithologist again until in 1881 when Alfonse Forrer visited Maria Madre and made a collection of birds, the greater part of which is presumed to be in the British Museum. Forrer's collection has never been reported upon except for references most of which are in the British Museum Catalogue of Birds and Salvin and Godman's *Biologia Centrali-Americana* (1879-1904).

In 1897, Nelson and Goldman spent the month of May investigating the three main islands of the group. Their itinerary indicates that they remained on Maria Madre from May 2 to May 25 and then moved to Maria Magdalena for 3 days (May 26 to 28) and to Maria Cleofas for 2 days (May 29 and 30). Nelson (1899: 8) mentions that as he and Goldman were preparing to depart from San Blas for the Tres Marias they were met by "a Prof. C. L. Herrick, his son, Harry, and Dr. T. S. Maltby from Socorro, New Mexico," who also were bound for the islands. The two parties joined and made the trip together. Nelson makes no further mention of the Herrick party, but that their visit to the islands was also of an ornithological nature is shown by the fact that the Rothschild collection, purchased by the



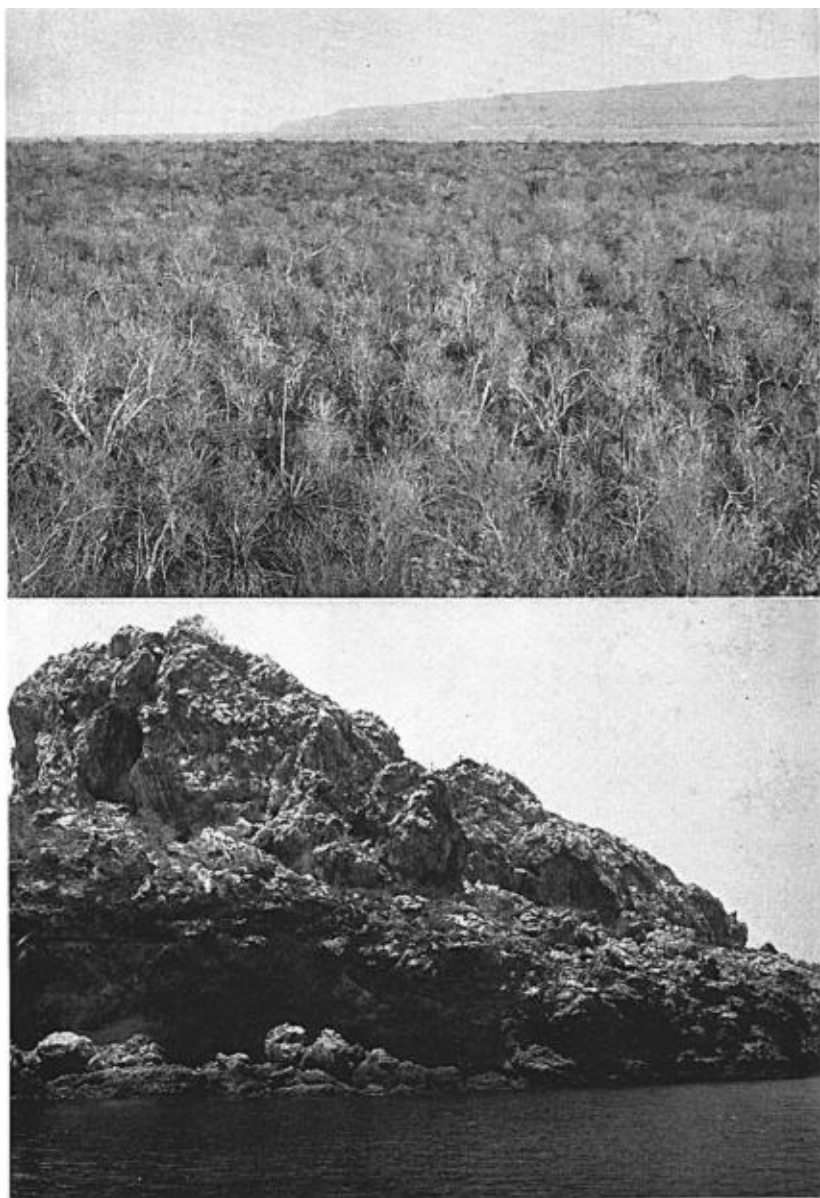
VEGETATION OF THE TRES MARIAS ISLANDS, APRIL, 1955. (Left) A Giant Fig (*Ficus* sp.) in the forest on the east side of Maria Cleofas. (Right) Dry stream course on the south drainage of Maria Magdalena showing abundance of vines and lianas.



VEGETATION OF THE TRES MARIAS ISLANDS, APRIL, 1955. (Above) Dense thorn and cactus thickets at shoreline on southeast side of Maria Magdalena. (Below) Forested interior of Maria Cleofas showing cycads (*Zamia* sp.) in foreground.



VIEWS OF THE TRES MARIAS ISLANDS, APRIL, 1955. (*Above*) Nesting colony of Blue-footed Boobies back of beach on southeast side of Maria Cleofas. (*Below*) Profile of heavy forest on southeast side of Maria Magdalena.



VIEWS OF SAN JUANITO ISLAND. (*Above*) Low, dense forest covering the island. View to the southeast showing Maria Madre in the background. (*Below*) North end of the island showing greatest elevation. Brown Pelicans use this pile of rocks as a nesting site.

American Museum of Natural History, contains a collection of between 200 and 300 birds from the Tres Marias, collected by C. L. Herrick between May 2 and 30, 1897. As in the case of Forrer's collection, this collection by Herrick has never been reported upon. I have examined a considerable amount of the Herrick material, but do not feel that I have uncovered all of the species his party may have collected.

For the next 28 years the islands remained untouched by ornithologists. On May 13, 1925, a field party from the California Academy of Sciences landed on Maria Madre and collected birds from May 13 to May 19, returning again on May 23 and 24. The period of May 19 to 22 was spent on nearby Maria Magdalena. Loye H. Miller and Alden H. Miller landed on Maria Madre June 26, 1925 and collected for three hours. The few skins taken by them in the vicinity of the penal colony on the east side of the island are in the collection of the University of California at Los Angeles. During the following October, McClellan (1927) spent six days (Oct. 21 to 26 inclusive) collecting birds on Maria Madre Island for the California Academy of Sciences. In 1926, the late A. E. Colburn evidently spent a little time in the island group. There are two specimens of the Western Willet (*Catoptrophorus*) bearing his name as collector in the Ed N. Harrison Collection labeled, "Maria Magdalena Island, November 29, 1926." The islands were not visited by ornithologists again until 1938, at which time Wm. H. Burt and the late George Willett accompanied by J. R. Pemberton put into Maria Magdalena for two days (February 9 and 10, 1938) and then moved on to Maria Cleofas for two days of collecting on this little-visited island. The specimens collected by Willett are in the collection of the Los Angeles County Museum, those collected by Burt, in the University of Michigan Museum of Zoology.

The Los Angeles County Museum's field work in April and May of 1955, here recorded, is the latest known investigation of these interesting islands insofar as their avifauna is concerned.

The main objective of our visit to the Tres Marias in 1955 was to bypass the relatively well-worked main island of Maria Madre and concentrate on the other three islands of the group, which have received less attention from ornithologists in the past. Departing from Mazatlan, Sinaloa, on April 17, 1955 aboard the power yacht "Malibu," our field party, consisting of Mr. and Mrs. Maurice A. Machris, Mr. and Mrs. Hal Roach, Jr., Mr. Harry F. Burrell, cinema photographer and me, proceeded south to Isabel Island. Isabel, a small volcanic island, lying midway between the Tres Marias and the

Nayarit coast, was reached after dark that same day. Two days were spent on Isabel examining and photographing the extensive sea bird colonies that use this tiny island as a breeding ground. Maria Madre was reached on the evening of April 20, and the morning of the 21st was spent traveling about the island as guests of General Pedrajo, governor of the penal colony. The anchorage at the south-east end of San Juanito was reached early the same afternoon and a collecting party was put ashore. Collecting on San Juanito continued through April 22 after which the "Malibu" proceeded to the southeast side of Maria Magdalena. Field work on Maria Magdalena extended from April 23 to April 26 inclusive, with departure for Maria Cleofas on the afternoon of the 26th. An anchorage at the east side of Maria Cleofas was reached at dusk of the same day and collecting ashore was begun on the morning of April 27. Work on this southernmost island extended through May 1, 1955 with the "Malibu" returning to Mazatlan on May 2, thus concluding a relatively short but very profitable investigation of the three least-known islands of this insular chain.

In evaluating the distribution of bird life within this insular group and reviewing the findings of previous workers, the gaps in our knowledge of the ornithology of the Tres Marias becomes apparent and it is hoped that subsequent investigations will serve to clarify many existing problems with regard to ecology and speciation of the bird life of these interesting islands.

THE BIRDS OF THE TRES MARIAS

The following species account deals only with those forms for which new information or observations have been obtained. No attempt has been made to discuss all species now occurring on the islands or those for which there are valid records of their presence only in the past. These are included, however, in the check list that follows this account.

Phaethon aethereus mesonauta Peters, Red-billed Tropic-bird.—Tropic birds breed on all four islands wherever suitable nesting cliffs are available. The offshore rocks and islets along the western sides of the islands are the most frequented areas. Numerous birds were noted flying in and out of the rocky bluffs at the north tip of San Juanito.

Pelecanus occidentalis californicus Ridgway, California Brown Pelican.—Nelson (1898) mentions pelicans as being uncommon about the Tres Marias and not nesting. In April of 1955 nesting colonies of this species were noted on San Juanito and on Maria Cleofas. On San Juanito the colony is confined to the high area at the north tip of the island. On Maria Cleofas the colony was nesting in low trees on the northeast corner of the island.

Sula nebouxii Milne-Edwards, Blue-footed Booby.—Breeding colonies were found only on San Juanito and Maria Cleofas. On San Juanito this species was found nesting at the same site as that mentioned by Nelson (1899). Nests were located in the short grass just above the high tide line on the south side of the island. In April 1955 the colony consisted of approximately 200 pairs. On Maria Cleofas there is a colony in a similar grass-type site just above the beach (Plate 21) at the southeast anchorage. In both colonies, we found stages from fresh eggs to abandoned young practicing flying and grouping at the water's edge.

Sula leucogaster nesiotes Heller and Snodgrass, Brown Booby.—Hundreds of boobies of this species nest on the precipitous offshore islet on the northwest side of Maria Cleofas. This is the same colony as that reported by Nelson in 1899. Approximately fifty pairs were noted nesting on the cliffs at the north end of San Juanito.

Fregata magnificens rothschildi Mathews, Man-O-War Bird.—Common about the Tres Marias, but found nesting only on San Juanito and Maria Cleofas. A few pairs were noted perched on low bushes among pelicans at the north tip of San Juanito, and several pairs were found occupying nesting trees at the northeast corner of Maria Cleofas. Most of the Tres Marias birds apparently range westward from Isabel Island where there are extensive nesting colonies.

Ardea herodias Linnaeus, Great Blue Heron.—Hérons of this species were noted along the shores and beaches of all four of the islands, but whether the species breeds on Tres Marias is not as yet determined. No specimens were taken, hence a sub-specific determination is not possible at this time.

Coragyps atratus (Beckstein), Black Vulture.—Grayson (1871) and Nelson (1899) both failed to find *Coragyps* in the Tres Marias. McClellan (1926) however reported them as fairly common on the beach at Maria Madre. On this occasion they were found mixing with the flocks of *Cathartes* in the vicinity of the settlement on the east side of the island. The species was not noted on any of the four islands during our period of field work in 1955.

Cathartes aura teter Friedmann, Turkey Vulture.—In contrast to the preceding species, Turkey Vultures were observed in considerable numbers on all of the four islands. Although there are no published records of the species nesting in the Tres Marias, it would seem safe to list the species as breeding there, as it is a species of wide and plentiful distribution throughout the islands.

Chondrohierax uncinatus uncinatus (Temminck), Hook-billed Kite.—Hook-billed Kites have not been previously reported from the Tres Marias although the species is known to be resident along the opposing mainland coast. On April 26, 1955 while collecting on the south side of Maria Magdalena, I was attracted by the shrill calls of this species along a forested stream course, just back from the beach. The bird was calling loudly and repeatedly, but no other individual of the species was observed. The specimen when collected proved to be an adult female in non-breeding condition. An examination of a series of skins of this species shows a wide range of individual variation in coloration, but this particular specimen exceeds most of the examples by its decidedly rufous coloring. The entire ventral surface is heavily suffused with rufous, including the throat and under tail coverts. The barring on the breast is not as distinct as that of Sinaloa birds (Moore Collection), owing to this rufous condition. The terminal white band of the tail is narrower and the large white bands are rufous on their inner webs. The nuchal collar is bright rufous compared to the buff-colored collars of Sinaloa birds. The wing measures slightly smaller (278 mm.) than wings of mainland birds.

As Grayson, Nelson, and McClellan all failed to note the species in the Tres Marias and our work only yielded one specimen, the species must be listed as of accidental occurrence pending further field work in the islands.

Buteo jamaicensis fumosus Nelson, Tres Marias Red-tail.—Red-tails were observed on all the islands except San Juanito, but so sparingly as to indicate that the population is rather small. I have not had an opportunity to examine specimens of this insular subspecies critically, so cannot comment on its validity as a race.

Caracara cheriway pallidus Nelson, Tres Marias Caracara.—A common species on all islands of the group. In my opinion *pallidus* is a poorly defined race, as all birds examined from the Tres Marias prove to be somewhat darker than mainland birds rather than lighter as given by Nelson (1898) in his description of the race. The character for dorsal neck markings also fails to hold when island birds are compared with specimens from the mainland. There is a very slight size difference, the island birds being somewhat smaller.

Falco albigularis Daudin, White-throated Falcon.—Although Grayson's (1871: 269) sight record is probably quite accurate, this falcon has not been subsequently found by any other workers on the islands. A diligent search for the species in 1955 failed to disclose any trace of this small falcon, and it can only be listed as of accidental occurrence.

Lophortyx douglasii (Vigors), Douglas Quail.—On the morning of April 21, 1955 while driving along the road leading north from the penal colony on Maria Madre to the home of the governor of the island, at a place called Nayarit, it was necessary to stop the vehicle to enable a flock of approximately twenty-five quail to cross the road. The birds were quite undisturbed and passed within 15 feet of the car, thus permitting positive identification. The species is without doubt a plant on Maria Madre, as so obvious a species would have been detected by previous observers on this well-worked island. Unfortunately it was impossible to collect any specimens at the time and no subspecific determination is possible at this writing. Numerous officials, including the governor of the islands, were questioned as to the origin of the birds, but no one was able to shed any light on the subject. According to the governor, the birds have always been there. It is possible that the introduction may have been made around 1903, as that is the time that Hanna (1926) reports the introduction of deer (*Odocoileus virginianus*) and domestic goats on Maria Magdalena Island.

Pluvialis dominica dominica (P. L. S. Müller), American Golden Plover.—The Golden Plover has not previously been reported from the Tres Marias. During our investigations in April 1955, Golden Plover were noted on several occasions on the tidal shelf rock on the south side of Maria Magdalena Island. In each instance the birds were solitary, but numerous enough to list the species as of casual occurrence. A female taken on April 24, 1955 has a wing measurement of 74 mm. and is assignable to the race *dominica*.

Catoptrophorus semipalmatus inornatus (Brewster), Western Willet.—Willetts were noted on the sandy beach in front of the abandoned prison barracks at the southeast end of San Juanito Island on April 21, 1955. Several individuals of this species were also present on the tidal shelf rock on the southeast side of Maria Magdalena between April 23 and 26, 1955. In the Ed N. Harrison ornithological collection in Los Angeles there are two females labeled Tres Marias Islands, taken on November 29, 1926 by A. E. Colburn; other than these specimens, which were not recorded, there is no evidence of the species having been noted previously.

Heteroscelus incanus (Gmelin), Wandering Tattler.—A solitary tattler was col-

lected April 22, 1955 on San Juanito Island. No other individuals of this species were noted. Tattlers have not previously been recorded from the Tres Marias.

Crocethia alba (Pallas), Sanderling.—On April 21, 1955, several individuals of this species were observed feeding on the sandy beach in front of the abandoned prison barracks on San Juanito Island. A single specimen of this previously unrecorded species was taken from the above mentioned flock.

Larus heermanni Cassin, Heermann Gull.—Gulls of all species are uncommon on the Tres Marias group. Nelson (1899) refers to nesting evidence of this species on Maria Cleofas, but the record is not convincing. Numerous small fishing craft from the Nayarit coast put into the anchorage on the east side of Maria Cleofas and often have a small number of Heermann Gulls following in their wake. On April 26, 1957 a small fishing craft was noted several miles off Maria Cleofas with a small complement of gulls scavenging in its wake. The boat anchored overnight at Cleofas and departed the following morning. The Heermann Gulls that had arrived with it, remained behind upon its departure. After two days, however, the gulls had deserted the anchorage area and were not seen again. Although scarce on the Tres Marias, *Larus heermanni* is a very common nesting species on Isabel Island, lying midway between the Tres Marias and the Nayarit coast.

Columba flavirostris madrensis Nelson, Red-billed Pigeon.—These large pigeons were noted in considerable numbers on all of the islands with the exception of Maria Cleofas. On this latter island the species was not detected during our several days' stay, although a constant search was made for it. On Maria Magdalena large numbers of the pigeons were flushed from tree tops where they were feeding on a small guava-like fruit. They were also numerous about the small pools of the intermittent streams. The apparent lack of surface water on Maria Cleofas may account in part for the apparent absence of pigeons on that island.

Zenaidura macroura carolinensis (Linnaeus), Mourning Dove.—An intensive search on all of the islands other than Maria Madre failed to reveal any trace of this species of dove, and it is felt that it can be considered as of only accidental occurrence. The only record of *Zenaidura* for the Tres Marias is based upon the single specimen taken by Nelson and Goldman in 1897 on Maria Madre and subsequently described by Ridgway (1915) as *Zenaidura macroura tresmariae*. Aldrich and Duvall (MS), however, assign the specimen to the subspecies *carolinensis* after a critical study of the geographic races of the species and examination of the Ridgway type.

Zenaida asiatica mearnsi (Ridgway), White-winged Dove.—Although present in considerable numbers on all of the islands of the Tres Marias group, this dove is outnumbered by *Leptotila* and *Columbigallina*. *Zenaida* was least abundant on Maria Cleofas, but could always be found in the forest margin directly behind the beaches on the eastern side of that island.

Columbigallina passerina pallescens (Baird), Common Ground-dove.—An especially numerous species in the Tres Marias. On Maria Magdalena these minute doves were concentrated in the greatest number along the stream courses where small pools of water were still to be found in late April and early May. Even on Maria Cleofas, where no visible surface water was detected, the species was present in sizeable numbers.

Leptotila verreauxi capitalis Nelson, White-tipped Dove.—An examination of specimens of this extremely abundant species shows the race to be fairly well defined. When compared with specimens of *angelica* from Sinaloa on the mainland, the culmen and wing of *capitalis* prove to be slightly larger (culmen, 19.0 mm.; wing,

153.0 mm.). Ventrally, specimens of *capitalis* are paler on the breast as well as on the abdomen. In a large series of *angelica*, however, it is possible to find specimens which possess ventral plumage equally pallid as in *capitalis*.

This ground-haunting dove was collected on all of the islands except San Juanito. On this latter island, however, the vegetative growth is ideal for its needs and a subsequent search of the island should reveal its presence there.

Forpus cyanopygius insularis (Ridgway), Blue-rumped Parrotlet.—Although Grayson (1871) and Nelson (1899) reported parrotlets as common on both Maria Madre and Maria Magdalena, McClellan (1926) found them uncommon on Maria Madre and failed to observe any on Maria Magdalena. Willett (field notes) did not observe the species on Maria Magdalena and Maria Cleofas during his work on those islands in 1938. Although we searched diligently for it in 1955, we failed to find it on any of the four islands visited. These small parrotlets are easily overlooked unless one is familiar with their habits and call. Whether or not there is any significance in the fact that field workers have not noted the presence of this species on the Tres Marias since 1926, can only be determined by subsequent visits to the islands.

Amazona ochrocephala tresmariae Nelson, Yellow-headed Parrot.—During the course of our field work in 1955, the large Yellow-headed Parrots were noted as common on all of the four islands of the Tres Marias. They were most frequently noted in pairs during the day as they fed in the tops of fruit-bearing trees. On Maria Cleofas approximately twenty birds of this species were observed roosting in a heavy stand of the large agaves which grew on a point of land near the southeast anchorage. The flock would appear in the roosting area late each afternoon and after perching atop the tall flowering stems of the agaves for a short period, would then descend into the lower spiny leaves of the plants within five feet or less of the ground. Each morning at sun-up the birds would assemble as a flock and fly off to their feeding grounds on the forested slopes of the island. Although Grayson and Nelson both remarked on the tameness and approachability of these large parrots in 1871 and 1899, it was found that they have now become as wild as the parrots on the mainland.

The Tres Marias Yellow-headed Parrot is a well-defined race; all birds examined show the very extensive amount of yellow on the head and neck in contrast to the lesser amount exhibited by the mainland race. The light green of the back as well as the bluish-green wash of the breast is also evident when a series of *tresmariae* is compared with skins of *oratrix* from Colima. At the present time the range of *Amazona ochrocephala* on the west coast of the Mexican mainland extends only to the state of Colima and therefore does not reach Nayarit opposite the Tres Marias Islands. It is quite probable that this species had a greater northerly range at a much earlier time and extended to the Tres Marias prior to the islands being cut off from the mainland. With the formation of the island group as a result of the subsidence of a former peninsula which probably extended northwestward from the Jalisco coast just north of Banderas Bay, the peninsular population was isolated. In the Tres Marias, the species has maintained itself and evolved into the present recognizable race, while on the mainland it can be postulated that the range of the species has withdrawn to its present line in Colima.

Nyctidromus albicollis insularis Nelson, Tres Marias Pauraque.—Pauraques were only encountered by our party on Maria Magdalena, but subsequent search should reveal their presence on Maria Cleofas as terrain conditions on this latter island are similar to those of Maria Magdalena. The species is known to be abundant on

Maria Madre, as Grayson, Nelson, and McClellan all reported it from this island. On Maria Magdalena, Pauraques were most frequently encountered late in the afternoon or after darkness, but on several occasions individuals were collected as they fluttered along the shady stream courses during broad daylight. A comparison of specimens from the Tres Marias with those of the opposing mainland shows that the wing length of *insularis* averages greater (163 mm.) as does the length of the tail (161.0 mm.). Nelson (1898: 9) in his description of the insular race of *Nyctidromus*, remarks on the constancy of coloration of birds from the Tres Marias compared with the amount of variation demonstrated by birds from the mainland. In examining the series of Tres Marias birds at my disposal, I fail to find this statement to be correct, as the island birds also show a considerable amount of color variation ranging from grayish to slightly rufous. The only reliable characters appear to be the larger size of the wing and tail.

Cyanithus latirostris lawrencei (Berlepsch), Broad-billed Hummingbird.—A common species in the Tres Marias. Broad-billed Hummingbirds were observed by our party on all of the islands of the group with the exception of San Juanito. More intensive work on this latter island should, however, reveal its presence there as the plant cover appears to be adequate to its needs. The subspecies *lawrencei* is a well-defined race, being considerably larger than the mainland form. Dorsally it is suffused with coppery red compared to the bluish back of the race *latirostris* occurring in Nayarit. The throat of *lawrencei* is green rather than the blue of mainland birds.

Amazilia rutila graysoni Lawrence, Cinnamomeous Hummingbird.—As in the preceding species, this hummingbird is a common bird in the Tres Marias Islands and was observed by our party on all of the islands of the group with the exception of San Juanito. Specimens of the race *graysoni* are easily separated from birds of the mainland on the basis of their greater size.

Trogon elegans goldmani Nelson, Elegant Trogon.—Trogons have to date been reported from only Maria Madre and Maria Magdalena. A careful search was made for the species on Maria Cleofas but no individuals were found although Burt collected a female there on February 12, 1938. Vegetative conditions on San Juanito do not appear to be favorable for its presence on that island. On Maria Madre and Maria Magdalena, they are a fairly common species and are most frequently encountered in the more heavily forested portions of the islands.

Nelson in his description of the subspecies (1898: 8) states that the adult male birds are decidedly more greenish dorsally than male specimens from the mainland. In comparing a large series of skins from both areas, however, I fail to find any appreciable color differences in male birds; the skins from the islands exhibit just as much coppery sheen to the back as found in skins of *ambiguus*. The only discernible differences in *goldmani* appear to be the more ash-colored backs and paler rufous color of the middle rectrices in the females. There is no appreciable difference in measurements between mainland and island birds. Consequently I feel that *goldmani* is at best a poorly differentiated subspecies.

Dendrocopos scalaris graysoni (Baird), Ladder-backed Woodpecker.—A common species on all of the islands of the group. It is most frequently encountered in the thorny thickets of low shrubs, agaves, and terrestrial bromeliads just back of the beaches and is less common in the heavier forests. The low mat of vegetation covering San Juanito Island is especially well suited to the needs of this small woodpecker, and the species was found to be exceedingly common on this particular island.

Platypsaris aglaiae insularis Ridgway, Rose-throated Becard.—At the present time becards have been recorded from Maria Madre Island only and although a search was made for the species on Maria Magdalena and Maria Cleofas during our work there, no specimens were observed or collected. A more thorough search of these latter islands at a future date may show it to be present. The density of the vegetation on both islands is adequate for its needs and it may have just been overlooked.

Tyrannus melancholicus occidentalis Hartert and Goodson, Tropical Kingbird.—Flycatchers of this species have been previously recorded from all of the islands of the Tres Marias group with the exception of San Juanito. The species evidently moves back and forth between the islands and the mainland with little effort, as a lone individual came aboard the "Malibu" on April 20, 1955 as the ship was enroute between Maria Madre and Isabel Island.

Myiarchus tuberculifer tresmariae Nelson, Tres Marias Flycatcher.—These small flycatchers occur on all of the four islands and are the most obvious species of flycatcher in the island group insofar as numbers of individuals are concerned. The subspecies *tresmariae* is of doubtful validity as the differences between it and the mainland race, *olivascens*, are so slight as to be almost non-existent. There is no appreciable difference in coloration and the size differential is very slight. Unfortunately there are no large series of island birds available for a detailed study at the present time. When sufficient series are available in the future, it may be possible to determine the validity of this race.

Empidonax difficilis difficilis Baird, Western Flycatcher.—Grayson reported this flycatcher as common on Maria Madre, but Nelson found it sparingly on Maria Madre and Maria Magdalena. On February 9, 1938, Willett took two specimens on Maria Magdalena. A single specimen was taken by our party on Maria Cleofas on April 28, 1955 and no other individuals were noted. These three birds compare most closely with typical specimens of the race *difficilis*. Migrants of this species are apparently much more abundant in the islands during the winter months.

Elaenia viridicata minima Nelson, Greenish Elaenia.—Although recorded from Maria Madre and Maria Magdalena by both Grayson and Nelson, this small flycatcher was not noted by Willett in 1938, nor by our party in 1955. In his description of the race, Nelson (1898) mentions that a specimen taken by Grayson is typical of *jaliscensis*, showing that this latter race is also to be looked for in the islands as a straggler during the winter months.

Camptostoma imberbe Sclater, Beardless Flycatcher.—During the course of their work in the islands in 1897, Nelson and Goldman took two specimens of this species on Maria Madre and observed a few others. Willett failed to find it on Maria Magdalena or Maria Cleofas in 1938. During the course of our work in 1955 a single specimen was taken on San Juanito, but this individual was too badly damaged to permit subspecific determination. A solitary individual was observed on Maria Cleofas on May 27, 1955, but it was not collected. Consequently, it is impossible to state at this time whether the birds reaching the Tres Marias represent typical *imberbe* or *ridgwayi*; I have not had the opportunity of examining the two specimens taken by Nelson.

Thryothorus felix lawrencii Ridgway, Lawrence's Wren.—Wrens of this species are relatively abundant on all of the islands of the Tres Marias group with the exception of San Juanito. This latter island lacks the shaded canyons and heavy vegetation characteristic of the other three islands and hence does not seem to meet the habitat requirements of *Thryothorus*. Nelson (1899) remarks on the

extreme tameness of *Thryothorus* on Maria Magdalena and describes the incident in which Goldman was actually able to capture a wren as it foraged on the ground near him. On one occasion during our stay on Magdalena, while "squeaking" for birds along a wooded stream course, I was able to decoy a wren within one foot of my face. No attempt was made to capture this individual, however.

The subspecies *lawrencii* is a well-defined pallid race named by Ridgway (1878) from Maria Madre Island and is easily separated from *Thryothorus f. pallidus* of the opposing mainland by the lesser amount of streaking on the side of the head and the decidedly more pallid coloring of back and ventral areas.

Nelson (1898), after a study of *T. felix* from adjacent Maria Magdalena, described the race *magdalanae* and stated that birds from this island although identical in size to *T. f. lawrencii* of Maria Madre, were darker in coloration. At the time of Nelson's study the species had not been taken on Maria Cleofas to the south. Willett, in 1938, took a single specimen on Maria Cleofas and our party in 1955 succeeded in taking three additional specimens on this same island. Comparison of this material, and specimens obtained on Maria Magdalena in 1955, with *T. f. lawrencii* from Maria Madre indicates that the birds of all three islands are inseparable as to race and that *magdalanae* should be considered a synonym of *lawrencii*; with but one well-defined subspecies occupying the three islands. Measurements of *lawrencii* from Maria Cleofas are as follows: 1 ♂ wing 62.0 mm., tail 55.0 mm., culmen 7.5 mm. Average of 3 ♀ wing 55.3 mm. (54-56.2 mm.); tail 54.2 mm. (52-58 mm.); culmen 5.7 mm. (5.0-6.0 mm.).

Melanotis caerulescens longirostris Nelson, Blue Mockingbird.—Blue Mockingbirds are common on the three larger islands but have not as yet been recorded from San Juanito. The species was noted as exceedingly common in the heavy forests of Maria Cleofas during our investigations there in the latter part of April, 1955. While "squeaking" for birds in the heavy forests of Cleofas, it was not unusual to have as many as six or eight individuals scolding within ten feet of me at one time. An examination of a series of island mockingbirds, shows *longirostris* to be a recognizable race with wing and tail definitely shorter than the opposing mainland form. The bill is longer than in *effulvius*. Insular birds are somewhat paler than mainland specimens, but this latter character is not well marked.

Turdus rufo-palliatus graysoni (Ridgway), Tres Marias Robin.—An exceedingly abundant species on all of the islands except San Juanito. Further search on this latter island may also reveal the presence of robins there as terrain and vegetation appear to be suited to its needs. On Maria Magdalena during April 1955, flocks numbering 150 to 200 birds were frequently encountered in the forested canyons. The subspecies *graysoni* is a well-defined pallid race with a large bill and requires no detailed taxonomic comment at this time.

Myadestes obscurus insularis Stejneger, Tres Marias Solitaire.—Grayson and Nelson both found the solitaire to be common at the higher elevations on Maria Madre and Maria Magdalena. Neither Willett in 1938, nor our party in 1955, had the opportunity of working along the crests of the islands and consequently none of us encountered the species during our respective visits. Although not recorded from Maria Cleofas to date, it is quite possible that the species will be found on this island when a more thorough investigation is made of the island at a future date.

Vireo hypochryseus sordidus Nelson, Golden Vireo.—Although not previously recorded from Maria Cleofas, this small yellow vireo was found occurring there in relative abundance during the course of our investigations in April, 1955. Grayson

and Nelson reported it from Maria Madre and Maria Magdalena and our party found it abundant on this latter island. The species has not yet been found on San Juanito, however. The race *sordidus* is readily distinguished from mainland birds by its definitely duller yellowish-green coloration.

Vireo olivaceus forreri (Madarasz), Forrer's Red-eyed Vireo.—Red-eyed vireos are one of the commonest avian species in the Tres Marias and it is interesting that Grayson failed to record it during any of his visits to the islands. Nelson found it to be abundant in 1897 and it was noted as common by our party in 1955 on Madre, Magdalena, and Cleofas. It was not observed, however, during our two days' investigation on San Juanito. The question as to whether or not this vireo is migratory is yet to be answered. Willett and Burt apparently did not find it on Magdalena or Cleofas in February 1938, as there are no specimens of this species in the material collected by them. Whether the species was merely missed by them or was actually absent from the islands is unknown. Subsequent field work during the winter months should, however, solve this riddle. Comparison of *forreri* with *hypoleucus* of the mainland shows the island form to be a well-defined race with greater size and almost non-existent superciliary streak.

Parula pitiayumi insularis (Lawrence), Tres Marias Parula Warbler.—If not the most abundant land bird in the Tres Marias, the Parula Warbler is at least the most obvious species, and is encountered on all of the four islands. There appears to be considerable movement by this species between the island group and the adjacent mainland of Nayarit. In the R. T. Moore collection at Occidental College there are six skins from San Blas taken by Chester C. Lamb in March of 1948; four of these are labeled *pulchra* × *insularis* and two appear to be typical *insularis*. The presence of a second insular race, *P. p. graysoni*, far to the westward on Socorro Island of the Revilla Gigedos, indicates that the species has the tendency for island occupation by over-water flight; Socorro is a purely volcanic oceanic island with no previous land bridge.

Seiurus aurocapillus cinereus Miller, Gray Oven-bird.—The Oven-bird has previously been recorded from the Tres Marias by McClellan (1926) who collected a single specimen May 16, 1925 on Maria Madre. A second specimen for the islands was taken by me on Maria Cleofas, May 1, 1955. Miller (1942) in his study of the Oven-birds of the Rocky Mountain area, examined the Maria Madre specimen and assigned it to his western race *cinereus*. In comparing the Maria Cleofas specimen with a large series of typical *aurocapillus* from the eastern United States, I find that it agrees with Miller's description of the western form in color. The back, rump, and rectrices are grayer and paler and not as green as in typical *aurocapillus*. The Maria Cleofas specimen, an adult male, is in fresh spring plumage and shows practically no wear. Measurements are almost identical to those listed for the type of *cinereus* and are as follows: Wing 72.5 mm., tail 49.2 mm., bill from nostril 8.6 mm. and tarsus 21.2 mm. Testes measured 2 mm. The Cleofas bird was collected as it foraged at the base of a deciduous tree in a shallow arroyo just back of the beach on the southeast side of the island.

Granatellus venustus francescae Baird, Red-breasted Chat.—This beautiful and well-defined subspecies occurs sparingly in the Tres Marias. Grayson, Nelson, and McClellan all recorded it from Maria Madre. Burt collected a male on Maria Magdalena on February 9, 1938, but he and Willett failed to find it on Cleofas. On April 24, 1955 I secured an adult pair in a heavily wooded canyon on the southeast slopes of Maria Magdalena, and on April 29, 1955 a female was taken on Maria Cleofas. Both Grayson and Nelson comment on the terrestrial activities of this

species and state that it is seldom arboreal in its foragings for food. It is therefore of interest to note that on both occasions when the species was seen in 1955, the birds were not on the ground, but were found feeding among the branches of forest trees, approximately ten feet above the ground. The scattered black feathers of the pectoral collar of *francescae* readily distinguish the island race from the mainland form which possesses a well-defined black collar on the chest.

Molothrus ater obscurus (Gmelin), Dwarf Cowbird.—The cowbird has not been previously recorded from the Tres Marias. Consequently it was of interest to note the presence of one individual of this species on San Juanito in 1955. This specimen, an adult male, was collected April 21, 1955 by Mrs. Maurice A. Machris. The cowbird's occurrence was obviously accidental as no other individuals were observed. The specimen is assigned to the race *obscurus* because of its small size. It compares favorably with a large series of skins of this small race in the collection of the Los Angeles Museum. Measurements are as follows: wing 100.2 mm., tail 67.0 mm., exposed culmen 15.1 mm., and tarsus 10.9 mm.

Icterus pustulatus graysonii Cassin, Streak-backed Oriole.—An abundant species on all four islands of the group. Although not previously reported from San Juanito, it was found to be exceedingly common on this particular island during our visit there on April 21 and 22, 1955. Because of its large size and brilliant plumage, this well-defined subspecies forms a dominant item of the avifauna of these islands. The almost complete lack of dorsal black streaking and the prominent yellow cast of the throat and chest, rather than the red of the mainland form *microstictus*, immediately separate this insular form from the other members of the polytypic species.

Piranga bidentata flammea Ridgway, Flame-colored Tanager.—Tanagers of this species are relatively abundant in the Tres Marias and are easily noted by their brilliant, red-orange plumage. The species has been previously recorded from Maria Madre and Maria Magdalena by Grayson and Nelson, and our party found it fairly common on Maria Cleofas in 1955. The dorsal color of *flammea* appears darker than in specimens of *bidentata* from the mainland. There is also a lesser amount of greenish-yellow in the back color of *flammea*. The restricted size of the white spots in the rectrices compared to those of *bidentata* also holds fairly well as a diagnostic character for *flammea*. Measurements of three adult males from Maria Magdalena are as follows: wing 97.5; 98; 98.5; tail 78; 81; 83; culmen 17.6; 17.6 and 18.0.

Richmondia cardinalis mariae Nelson, Tres Marias Cardinal.—The Cardinal is an abundant species in the Tres Marias and is an obvious member of the island avifauna because of its brilliant coloration and unsuspecting nature. It is plentiful on all of the four islands and was noted in numbers on San Juanito. An examination of a series of skins from all four islands shows that the race *mariae* differs from *igneus* of Baja California in that the dorsal coloring of males is a richer red with less grayish tipping to the feathers. Ventrally, males of *mariae* are somewhat more red than males of *igneus*. The bill is more swollen and the tarsus is considerably longer and heavier. In his description of the race *mariae*, Nelson (1898: 10) states that the females of *mariae* are very distinct from females of *igneus* in that the former have a large, whitish throat area and the entire abdomen is whitish which results in a broad pectoral band of buff. An examination of a series of four females of *mariae* fails to substantiate this character. Male cardinals from the Tres Marias are more orange-red than males of *sinaloensis* from Jalisco. In this series the throats of the females are white but the abdomens are buff.

Passerina ciris pallidior Mearns, Painted Bunting.—Painted Buntings have not previously been recorded from the Tres Marias Islands, so it was of considerable interest that the species was encountered on Maria Magdalena Island on April 26, 1955. On this occasion I collected a solitary female as it came to water at a small pool in a stream bed on the southeast side of the island. No other individuals of this species were observed during our stay in the islands. The above-mentioned specimen is tentatively assigned to the western race *pallidior* on the basis of its decidedly dull gray-green coloration. Measurements of the specimen are as follows: wing 64.0 mm., tail 49.0 mm., culmen from base 10.5 mm.

Spinus psaltria psaltria (Say), Dark-backed Goldfinch.—These small goldfinches occur abundantly on Maria Madre and Maria Magdalena, and sparingly on Maria Cleofas. The species has not been previously recorded from Maria Cleofas, but there is an adult male in the collection of the Los Angeles County Museum taken by George Willett from this latter island on February 12, 1938. The species was not observed on San Juanito. Adult males from the islands all show uniform jet black backs except for the normal white patterned wings.

CHECK-LIST OF BIRDS OF TRES MARIAS ISLANDS

A careful tabulation of all species recorded by previous ornithologists and information resulting from our own recent work within the island group is given here as an aid to those workers who may visit the Tres Marias in the future. Several species that are not considered as validly recorded have been omitted from the list until their presence within the islands can be definitely verified. Species dropped are: *Speotyto cunicularia*, *Micrathene whitneyi*, *Corvus ossifragus*, *Cissilopha beecheii*, and *Hirundo rustica*. Species listed as accidental are records of but one individual specimen. Species for which there are several records, but not enough to consider them as resident, are listed as casual. The islands are listed numerically as follows: 1 (Maria Madre), 2 (Maria Magdalena), 3 (Maria Cleofas), and 4 (San Juanito).

<i>Phaëthon aethereus mesonauta</i>	Breeding	1, 2, 3, 4
<i>Pelecanus occidentalis californicus</i>	Breeding	1, 2, 4
<i>Sula neboxii</i>	Breeding	3, 4
<i>Sula leucogaster nesiotis</i>	Breeding	3, 4
<i>Fregata magnificens rothschildi</i>	Breeding	2, 3, 4
<i>Ardea herodias</i> ssp.	Casual	1, 2, 4
<i>Casmerodius albus egretta</i>	Accidental	1
<i>Leucophoyx thula thula</i>	Accidental	1
<i>Nyctanassa violacea bancrofti</i>	Casual	1
<i>Plegadis falcinellus mexicana</i>	Casual	1
<i>Coragyps atratus</i>	Casual,	1
	possibly breeding	
<i>Cathartes aura teter</i>	Breeding	1, 2, 3, 4
<i>Chondrohierax uncinatus uncinatus</i>	Accidental	2
<i>Buteo jamaicensis fumosus</i>	Breeding	1, 2, 3
<i>Pandion haliaëtus carolinensis</i>	Breeding	1, 2, 3, 4

<i>Caracara cheriway pallidus</i>	Breeding	1, 2, 3, 4
<i>Falco peregrinus anatum</i>	Accidental	1
<i>Falco albigularis</i> ssp.	Accidental	1
<i>Falco sparverius</i> ssp.	Accidental	1
<i>Lophortyx douglasii</i> ssp.	Breeding	1
<i>Fulica americana americana</i>	Casual	1
<i>Haematopus ostralegus frazari</i>	Breeding	1, 2, 3, 4
<i>Pluvialis dominica dominica</i>	Casual	2
<i>Charadrius hiaticula semipalmatus</i>	Accidental	1
<i>Charadrius vociferus vociferus</i>	Accidental	1
<i>Numenius phaeopus hudsonicus</i>	Casual	2, 4,
<i>Numenius americanus</i> ssp.	Accidental	1
<i>Tringa flavipes</i>	Accidental	1
<i>Actitis macularia</i>	Casual	1, 2, 3, 4
<i>Catoptrophorus semipalmatus inornatus</i>	Casual	2, 4
<i>Heteroscelus incanus</i>	Accidental	4
<i>Crocethia alba</i>	Accidental	4
<i>Erolia melanotos</i>	Casual	1, 2, 4
<i>Himantopus mexicanus</i>	Accidental	1
<i>Larus heermanni</i>	Casual,	1, 2, 3
	possibly breeding	
<i>Larus argentatus smithsonianus</i>	Accidental	4
<i>Thalasseus maximus maximus</i>	Accidental	3
<i>Columba flavirostris madrensis</i>	Breeding	1, 2, 3
<i>Zenaidura macroura carolinensis</i>	Accidental	1
<i>Zenaida asiatica mearnsi</i>	Breeding	1, 2, 3, 4
<i>Columbigallina passerina pallescens</i>	Breeding	1, 2, 4
<i>Leptotila verreauxi capitalis</i>	Breeding	1, 2, 3
<i>Forpus cyanopygius insularis</i>	Breeding	1, 2
<i>Amazona ochrocephala tresmariae</i>	Breeding	1, 2, 3, 4
<i>Coccyzus minor palloris</i>	Casual	1
<i>Tyto alba praticola</i>	Accidental	1
	(heard calling)	
<i>Chordeiles acutipennis texensis</i>	Casual	1
<i>Nyctidromus albicollis insularis</i>	Breeding	1, 2
<i>Cyananthus latirostris lawrencei</i>	Breeding	1, 2, 3
<i>Amazilia rutila graysoni</i>	Breeding	1, 2, 3
<i>Trogon elegans goldmani</i>	Breeding	1, 2, 3
<i>Ceryle alcyon caurina</i>	Accidental	1
<i>Dendrocopos scalaris graysoni</i>	Breeding	1, 2, 3, 4
<i>Platypterus aglaiae insularis</i>	Breeding	1
<i>Tyrannus melancholicus occidentalis</i>	Breeding	1, 2, 3
<i>Myiarchus tyrannulus magister</i>	Breeding	1, 2, 3
<i>Myiarchus tuberculifer tresmariae</i>	Breeding	1, 2, 3
<i>Contopus richardsonii</i>	Casual	1
<i>Empidonax difficilis difficilis</i>	Casual	1, 2, 3
<i>Elaenia viridicata minima</i>	Breeding	1, 2
<i>Elaenia viridicata jaliscensis</i>	Accidental	1
<i>Comptostoma imberbe imberbe</i>	Casual	1, 3, 4
<i>Thryothorus felix lawrencii</i>	Breeding	1, 2, 3

<i>Melanotis caerulescens longirostris</i>	Breeding	1, 2, 3
<i>Mimus polyglottos leucopterus</i>	Breeding	1, 2
<i>Turdus rufo-palliatu graysoni</i>	Breeding	1, 2, 3
<i>Myadestes obscurus insularis</i>	Breeding	1, 2
<i>Hylocichla ustulata ustulata</i>	Casual	1, 2
<i>Hylocichla ustulata swainsoni</i>	Casual	1, 2
<i>Vireo hypochryseus sordidus</i>	Breeding	1, 2, 3
<i>Vireo olivaceus forreri</i>	Breeding	1, 2, 3
<i>Parula pitiayumi insularis</i>	Breeding	1, 2, 3, 4
<i>Dendroica petechia morcomi</i>	Accidental	1
<i>Dendroica petechia rubiginosa</i>	Accidental	1
<i>Dendroica auduboni auduboni</i>	Accidental	1, 3, 4
<i>Dendroica townsendi</i>	Accidental	1
<i>Seiurus aurocapillus cinereus</i>	Accidental	1, 3
<i>Granatellus venustus francescae</i>	Breeding	1, 2, 3
<i>Wilsonia pusilla chryseola</i>	Accidental	1
<i>Molothrus ater obscurus</i>	Accidental	4
<i>Cassidix mexicanus graysoni</i>	Accidental	1
<i>Icterus pustulatus graysonii</i>	Breeding	1, 2, 3, 4
<i>Piranga ludoviciana</i>	Accidental	1
<i>Piranga bidentata flammea</i>	Breeding	1, 2, 3
<i>Richmondia cardinalis mariae</i>	Breeding	1, 2, 3, 4
<i>Passerina ciris pallidior</i>	Accidental	2
<i>Carpodacus cassinii</i>	Accidental	1
<i>Spinus psaltria psaltria</i>	Breeding	1, 2, 3

DISCUSSION AND CONCLUSIONS

A comparison of the early avifauna of the islands, as observed in 1865-1867 and 1897 by Grayson and Nelson, with that of the present as noted by our party in 1955, indicates that there has been little or no disturbance of the many resident genera of the island group. The only bird of questionable status is *Forpus cyanopygius*, which has not been reported from any of the islands except Maria Madre since 1899. As stated previously, however, this may be an oversight upon the part of ornithologists visiting the islands subsequent to Nelson's work. The stable condition of the bird life of the Tres Marias is in marked contrast to its appalling decline on Guadalupe Island to the north, as shown by Howell and Cade (1954). There is a disturbing indication, however, that the continued occupation and use of Maria Madre will alter the avifaunal and botanical picture of this large island. Also the introduction of deer and domestic goats upon Maria Magdalena presents a potential threat to this island although the dense concentration of plant growth covering the island so far shows no appreciable change.

The absence on the islands of certain genera of the opposing main-land is of interest and as yet cannot be satisfactorily explained.

Ecologic conditions appear to be favorable for *Calocitta*, *Cissilopha*, *Piaya*, *Momotus*, *Aratinga*, and *Pipilo*, yet these genera are totally absent from the island group. The presence of *Pipilo* and *Aratinga* on outlying Socorro Island indicates that these genera were capable of negotiating a vast expanse of water at a very early date.

The presence of a race of *Amazona ochracephala* in the Tres Marias presents an interesting problem in avian distribution, as Yellow-headed Parrots today do not range northward on the opposing mainland coast beyond the latitude of the state of Colima. It is postulated here that the species may have had a more northerly distribution on the mainland at a much earlier period in geologic time, and possibly occupied the Tres Marias when the present islands were still a part of a probable peninsula extending northwesterly from the vicinity of Banderas Bay in the state of Jalisco.

Our investigations in 1955 have added seven additional forms to the previously known avifauna, as follows: *Chondrohierax u. uncinatus*, *Lophortyx douglasii*, *Pluvialis d. dominica*, *Catoptrophorus semipalmatus inornatus*, *Heteroscelus incanus*, *Crocethia alba*, *Molothrus ater obscurus* and *Passerina ciris pallidior*. Two previously named insular races are placed in synonymy as a result of this study. These are: *Zenaidura macroura tresmariae* (= *Z. m. carolinensis*) and *Thryothorus felix magdalenae* (= *T. felix lawrencii*).

Considerable information is yet needed relative to ecologic and life history problems of the birds of the Tres Marias. Especial attention is also needed with regard to the botany of the Tres Marias as this subject has been sadly neglected. It is hoped that the work of future biologists visiting these islands will fill the many gaps still apparent in our knowledge.

ACKNOWLEDGEMENTS

I wish to especially thank Mr. and Mrs. Maurice A. Machris, research associates of the Los Angeles County Museum, without whose help our 1955 visit to the islands would not have been possible. Not only did they provide the necessary financial support for the field work and for the accompanying color plate, but their untiring help in the actual collection of material and companionship in the field proved invaluable.

Thanks are due Dr. Robert T. Moore of Occidental College for permission to compare insular races with material from the adjacent mainland in the R. T. Moore Collection; Dr. Dean Amadon of the American Museum of Natural History for permission to examine Herrick's material in the Rothschild Collection; Dr. Alden H. Miller

of the Museum of Vertebrate Zoology for loan of comparative material; Dr. Thomas R. Howell of the University of California at Los Angeles for permission to examine a small collection of birds from Maria Madre; and to Mr. Ed N. Harrison of Los Angeles for permission to list the specimens of Western Willet taken by the late Albert E. Colburn on Maria Magdalena, which are in the Harrison collection. Last but not least, thanks are due Dr. Hildegarde Howard, Chief of the Division of Science at the Los Angeles County Museum, for her encouragement and advice and time spent in reading the manuscript of this paper.

LITERATURE CITED

- GRAYSON, A. J. 1871. The physical geography and natural history of the islands of the Tres Marias. Proc. Bost. Nat. Hist. Soc., **14**: 261-302.
- HANNA, G. D. 1926. Expedition to the Revillagigedo Islands, Mexico in 1925. General Report. Proc. Calif. Acad. Sci., **15**: 1-113.
- HOWELL, T. R., and T. J. CADE. 1954. The birds of Guadalupe Island in 1953. Condor, **56**: 283-294.
- MCCLELLAN, M. E. 1926. Expedition to the Revillagigedo Islands, Mexico, in 1925. VI. The birds and mammals, Proc. Calif. Acad. Sci., **15**: 279-322.
- MILLER, A. H. 1942. Differentiation of the Ovenbirds of the Rocky Mountain region. Condor, **44**: 185-186.
- NELSON, E. W. 1898. Descriptions of new birds from the Tres Marias Islands, western Mexico. Proc. Biol. Soc. Wash., **12**: 5-11.
- NELSON, E. W. 1899. Birds of the Tres Marias Islands. N. Amer. Fauna **14**: U. S. Dept. Agric., pp. 7-62.
- RIDGWAY, R. 1878. Description of a new wren from the Tres Marias Islands, Mexico. Bull. Nutt. Ornith. Club, **3**: 10.
- RIDGWAY, R. 1915. Descriptions of some new forms of American cuckoos, parrots, and pigeons. Proc. Biol. Soc. Wash., **28**: 105-107.
- SALVIN, O., and F. DUC. GODMAN. 1879-1904. Biologia Centrali-Americana, Aves I, II, III, and IV.

Los Angeles County Museum, Exposition Park, Los Angeles, California, June 28, 1957.