

NOTES ON WATER BIRDS AT MORRO BAY, CALIFORNIA

WITH THREE PHOTOS BY JOSEPH DIXON

By JOSEPH GRINNELL and RICHARD HUNT

The following notes which seem worth putting on permanent record are based upon specimens and field notes contained in the Museum of Vertebrate Zoology. These were obtained by a party from the Museum working in the fall of 1918 in the vicinity of Morro Bay, San Luis Obispo County, California (see, especially, San Luis Quadrangle, U. S. G. S.). The objects of the field work were of a rather general nature, but chiefly to test out the behavior geographically of the terrestrial vertebrates in this portion of California's coast belt. The particular information set forth in the present article was thus secured incidentally to other activities. The party consisted of Joseph Dixon, Halsted G. White and the senior writer, and work was continued by one or another of these persons from September 18 to November 7.

The junior author's contribution to the present report consisted in analysis and compilation of the field notes, with subsequent careful revision in collaboration with the senior author.

Admittedly, then, these notes are fragmentary, nowhere nearly as thoroughgoing as if the time of even one man could have been devoted continuously to observations upon the water birds. Furthermore, no observing was done outside the surf line; so pelagic birds were missed. But even so, there are facts here given, especially in regard to certain shore birds, that appear to add materially to previously published knowledge. The geographic position of Morro Bay on the coast of California makes our record of occurrences there noteworthy in comparison with the reports of Loomis and Beck from Monterey Bay to the northwestward, and of Torrey, Bowles and Howell, and Dawson from Santa Barbara to the southeastward. No doubt, concentrated attention to the water birds at Morro Bay, where conditions are so very favorable for them, would disclose the regular presence there of a number of species additional to the present list.

***AEchmophorus occidentalis*.** Western Grebe. Came to notice first on October 14, when two individuals were seen close in-shore along the exposed coast near Piedras Blancas lighthouse, some 35 miles northwest of Morro Bay. These birds were repeatedly diving in the rather shallow water inside the outermost reefs, where at the time there was little or no breaking of the surf.

A Western Grebe was watched by Dixon, who carried constantly and used judiciously a good pair of 8-power binoculars, on a sandy beach in Morro Bay, October 23. The bird went ashore voluntarily and proceeded to preen its feathers. In landing it swam into two inches of water, then started up with wings flapping as if about to take flight, but instead of clearing the ground altogether, it progressed two or three feet on its toes with the tarsi entirely off the ground and with body in nearly a vertical position. The bird then ceased to flap and sank down on its tarsi and scrambled forward a foot or two farther. At this point, it lay for several minutes on its side in the dry sand "combing" the feathers of its breast with its bill. When alarmed, the bird again assumed an upright position and started back toward the water, walking on its toes, not on its tarsi. After reaching water of sufficient depth it swam a few yards and then dove. The imprints of the bird's feet on the wet sand showed no trace of contact with the tarsi. As far as the observa-

tion went, on this particular individual, then, this species of grebe may progress on land by walking on its toes.

A Western Grebe shot on Morro Bay, October 27, proved to be a male (no. 29556, Mus. Vert. Zool.), and weighed 714.2 grams. Numerous minute white filaments (residual portions of the natal down), adherent to the tips of the blackish feathers along the sides of the neck, show this individual to be a bird-of-the-year.

Colymbus nigricollis californicus. American Eared Grebe. American Eared Grebes were frequently seen in both salt and fresh water ponds north of the town of Morro. Between dates September 19 and October 24, fourteen individuals were seen; two of them were in a brackish lagoon near the mouth of San Carpofo Creek.

Three females were collected (nos. 29557-59). Their weights in grams are as follows: 221.3, 251.4, 195.0. The last seems abnormally small, as further indicated by the following dimensions in millimeters: wing, 121.5; tarsus 41.0; culmen 19.8. This specimen when skinned was found to be very lean. The feathers of the breast in particular, and of the lower surface in general, were stained with asphaltum. The color of the iris was recorded for each specimen, using Ridgway's Color Standards and Color Nomenclature (1912) as basis of comparison. The tint was buffy white, according to one collector, and capucine yellow according to another.

Podilymbus podiceps. Pied-billed Grebe. One seen October 17 in a marshy part of Morro Bay two miles southeast of the town of Morro.

Gavia immer. Common Loon. Three or four individuals were seen at different times on the open bay. One female was collected, on October 27 (no. 29560). Its weight was 1895.0 grams; wing 310 mm.; tarsus 81.4; culmen, 69.5.

Stercorarius parasiticus. Parasitic Jaeger. Three individuals were noted along the ocean shore within two miles north of Morro, September 19, 27 and 28; in each case the bird was harassing or mauling a Royal Tern. The colors of soft parts were recorded from an immature male (no. 29561) shot September 27, shortly after the bird was killed, and were as follows: bill sepia at base, black at tip; iris hazel; feet and legs black, with one small spot of sky blue on left knuckle and two on right knuckle. The weight of this bird was 471.4 grams.

Larus occidentalis. Western Gull. Commonly seen flying singly or two or three together along the ocean beach or across the outer sandspit to the bay. Up to twenty-nine were seen at one time, but there were no such large congregations as one sees in the case of other species of gulls, migratory species that winter on our sea-coast.

An immature male (no. 29562) taken one mile north of Morro, October 2, weighed 960 grams. Colors of soft parts were as follows: bill dusky, almost black; iris hazel; feet pale ecru drab.

Larus californicus. California Gull. This and the following species were seen in small numbers throughout the period of observation, occurring both along the ocean shore and on tidal waters. Two flocks of seven each, seen along the outer beach of the spit on October 6, comprised the greatest number seen in one day by one observer.

Two immature birds were taken near Morro, September 20 (no. 29566) and October 8 (no. 29563). The first, a male, weighed 600 grams; feet and bill "pale ashy blue". The second, a female, weighed 478.5 grams.

Larus delawarensis. Ring-billed Gull. Two adult males were taken (nos. 29564, 65) on October 8 and 22. Weights and colors of soft parts are as follows: 553.2 and 489.1 grams, respectively; bill (in no. 29565) mineral gray with black subterminal "ring"; iris pinard yellow; feet and legs maize yellow, claws black; mouth (inside) peach red.

Larus heermanni. Heermann Gull. On October 2, about five were seen flying along the outer beach near Morro Rock. An adult female collected at that time (no. 29567) weighed 433 grams. The color of the iris was hazel, feet and legs black, and bill brazil red with black end.

Thalasseus maximus. Royal Tern. Royal Terns were seen each day of observation from September 19 to November 3, feeding or flying leisurely along the outer beach just beyond the breaker line. Also, when the tide was low, exposing several sandbars, the birds would flock together in large numbers inside of Morro Bay. On

one occasion (October 23) ninety-six were seen resting at one time on these sandbars. Approximately four-fifths of the terns seen during the entire period of observation belonged to this species.

The terns were rarely seen to rest on the exposed ocean beach, but were there always in flight. They seemed to know the tidal program, for at the uncovering of the sandbars, with ebbing tide inside the bay, the birds could be seen approaching for several miles along the sea-coast. Said sandbars afforded a safe retreat from nearly all enemies, since they were entirely surrounded by water. There the birds could take full advantage of the seemingly necessary daily period of rest and preening. The Royal, Elegant and Forster terns would often collect together on the sandbars, and when approached in a row-boat it was noted that they would take flight as to species in the order just given, which is the order in decrease of size. In other words, the larger the bird the shier it is.

Weights, and colors of soft parts, of the nine Royal Terns collected are as follows:

No. 29568, male, September 22: weight 532.5 grams; bill orange with straw yellow tip, feet and legs black, soles of toes dirty ochre yellow, iris hazel.

No. 29569, male, September 22: weight 456.5 grams; soft parts same as in preceding.

No. 29570, female, September 29: weight 510 grams; bill salmon yellow, feet and legs black, sole of foot salmon yellow, middle and outer claws white, inner one whitish; iris hazel.

No. 29571, female, September 29: weight 466.3 grams; bill salmon, feet and legs black, soles of toes salmon, claws black, iris brown.

No. 29572, male, September 29: weight 478.2 grams; colors not recorded, but as seen on dried skin appear to be about the same as in no. 29568; claws black.

No. 29573, male, October 17: colors of soft parts on dried skin about the same as in no. 29568, except that there is more straw yellow on tip of bill; feet, legs and claws black.

No. 29574, male, October 17: dried skin shows bill to be more yellowish than no. 29568; feet, legs and claws black.

No. 29575, female, October 22: dried skin shows bill to be more yellowish than no. 29568; feet, legs and claws chiefly black.

No. 30317, male, October 2: weight 482 grams; skeleton, only, saved.

No. 29576, immature female, October 2: weight 452 grams; examination of dried skin shows bill to be darker (dusky tinged) than no. 29568; feet and legs much more blotched with salmon color.

The average weights of three seemingly adult males is 489 grams, of two females 488 grams. Thus the sexes are probably identical as to size.

Thalasseus elegans. Elegant Tern. For full account of the occurrence of this species at Morro Bay and for matter relating to the specimens taken, see Grinnell, Condor, xxi, 1919, pp. 230-234.

Sterna forsteri. Forster Tern. The Forster Tern was positively identified around Morro Bay on various dates from September 23 to October 20. It was less numerously represented than the Royal, more numerously than the Elegant. Two examples preserved: nos. 29584-85, October 17 and 20.

Sterna hirundo. Common Tern. The only specimen of this species secured during the trip, and thus positively identified, was taken by Dixon, September 29, on a sandbar of Morro Bay from a flock "of about thirty". This bird, no. 29586, male, weighed 112.8 grams; feet brick red; iris dusky violet blue; bill, brick red at base, tip light. The outer webs of the outer tail feathers are light gray, not white.

Sterna paradisaea. Arctic Tern. This tern was recorded on October 2, 4 and 23 by Dixon. He estimated the number present on Morro Bay on October 23 at ten. Since both Common and Forster terns were present, and proved easily confusable at a distance, the relative numbers of *paradisaea* remain in doubt.

Phalacrocorax auritus albociliatus. Farallon Double-crested Cormorant. On September 20, between three and four hundred Farallon Cormorants were seen gathered together on the mud flats near the upper end of Morro Bay. Thereafter noted in small numbers, usually 2 to 6 flying over the bay, or standing on the crests of sand dunes on the sand-spit. Many were seen at times swimming in a pond at

the mouth of Morro Creek, and occasionally one was seen over the surf along the ocean beach. The yellow of the gular patch showed plainly at a surprisingly long distance when looked for.

A Farallon Cormorant in flight was seen to turn his whole head and neck back over his body to look at a fish which appeared at the surface of the water behind him. In doing this the bird set his wings, and coasted for a moment.

The numbers of dead cormorants found along the bay shore might indicate that some form of poisoning was active among these birds. Dixon recorded of one sick Farallon Cormorant found sitting on a bunch of cast-up sea-weed just above the reach of the incoming tide, that both eyes were shut, and the eyelids tightly gummed together. The bird's tail served as a prop which enabled it to keep upright posture, and the head was tucked back over the bird's shoulder, with the bill tucked under one wing, or at other times hanging loosely at one side. Not much attention was paid to sound, but the cormorant always struck back with its bill when touched.

Phalacrocorax penicillatus. Brandt Cormorant. Three of these cormorants were observed along the rocky sea-coast near Piedras Blancas lighthouse, October 8, one in flight, two perched on the pinnacle of an outlying reef.

Phalacrocorax pelagicus resplendens. Baird Pelagic Cormorant. Four were observed by Dixon, October 8, on a large rock off-shore, two miles south of Piedras Blancas.

Pelecanus erythrorhynchos. American White Pelican. Six were observed by Dixon, September 19, on a sandbar island near the middle of Morro Bay. On October 2 the number had increased to eight. White made record of four in the Bay south of Morro, October 27. Local hunters reported that between 100 and 200 White Pelicans wintered at Morro during the previous season (1917-1918).

Pelecanus occidentalis californicus. California Brown Pelican. Plentiful during the first few weeks of the party's stay at Morro, about 100 being recorded between September 18 and October 6. Later became much less common. The largest flock noted contained about 30 individuals. Small platoons of from 4 to 8 birds were seen skimming over the surf, diving for food just beyond the breaker-line, or (less commonly) settling on the mud-flats.

An immature male (no. 29588) shot over the Bay on October 31, weighed 5.1 kilograms and was excessively fat. Two two-inch fish were contained in the pouch.

An old fisherman interviewed was strong in his condemnation of the Brown Pelican as a destroyer of fish. Two Brown Pelicans were among the pelagic birds found dying or dead—the evident victims of some disease.

Mergus serrator. Red-breasted Merganser. A single flock of six was seen by Dixon in Morro Bay, September 22.

Mareca americana. Baldpate. One bird, an immature female, was obtained from a small fresh-water pond two miles north of Morro; and a few were seen flying over the Bay. Several were brought in soon after the opening of the shooting season, by sportsmen, who reported this duck the second most numerous on the upper part of the Bay.

Querquedula cyanoptera. Cinnamon Teal. Fourteen individuals recorded by White, in small ponds near mouth of Morro Creek. Two of these were seen September 24; twelve, October 14.

Nettion carolinense. Green-winged Teal. Six recorded by Grinnell the first morning out (September 19) in a slough north of town; seven observed in a slough at head of Bay, September 25. A flock of about 600 ducks, flushed by White from the mud-flats up the Bay, October 16, and evidently composed largely of Pintails, contained "a few" Green-winged Teal. One specimen, a female, was shot October 20 from a blind on a little island one mile south of Morro.

Spatula clypeata. Shoveller Duck. Two birds, only, recorded during the entire trip; these shot by White, October 20, from a blind on an island one mile south of Morro, and one of these saved for the Museum collection.

Dafila acuta tzitzihua. American Pintail Duck. By far the commonest duck at all times during the party's stay at Morro. Between September 19 and October 17 close to 1330 individuals were recorded by Dixon and White (though there was undoubtedly some duplication of "counts"). On the last day of the trip (November 7) the Pintail was still the predominating duck. The flocks noted contained from 3 to 500 individuals; flocks of from 15 to 25 seemed to be of commonest size.

Three specimens were taken, an immature female (no. 29594, weight 824 grams), and two immature males. One of these (no. 29592), taken October 10, is in curiously mixed plumage. The head, in general effect dark brown, is considerably mottled, especially on the upper throat, with rusty and buffy remnant feathers from the juvenal. The back presents a patch-work appearance owing to the irregular encroachment of the first-winter plumage upon the juvenal plumage. The underparts are generally whitish with sparse splotches of dusky. Most of the tail-feathers including the central pair are of the juvenal crop, each with expanded, club-shaped end of rachis. The feathers of the wing are entirely new, showing the light edgings of the lesser coverts indicating the first annual plumage of the male. The other male (no. 29593), taken October 14, is less far advanced in the post-juvenal molt. The head, back and entire underparts have a generally female-like appearance; all the tail feathers have the club-ended rachis, the central pair most noticeably; the wings are like those of the other male. The specimen is unique among those in the Museum series in having a transverse white bar on the fore neck—the first indication of a replacement of the dusky-mottled (juvenal) breast feathers by the pure white adult underplumage. The bill of this bird was pale sky blue on top, black on sides; feet, pale Russian blue, webs brownish black. Weight, 937.7 grams.

Nyroca affinis. Lesser Scaup Duck. The only individual recorded was taken by White, October 27, on the Bay south of Morro. It is a female (no. 29595) with unusually conspicuous white loreal-and-forehead patch. Weight 526.2 grams.

Charitonetta albeola. Buffle-head Duck. White saw a flock of seven, October 21, in a pond on the beach 2 miles north of Morro; and, on October 27, he noted that Buffle-heads were "becoming quite common". One bird was taken by Dixon from a flock of fourteen Coots, October 25, in a lagoon at the mouth of Morro Creek. This was an adult male (no. 29598), weighing 404 grams; bill dawn gray in front of nostril, slate gray at base; feet, pinkish vinaceous.

Histrionicus histrionicus. Harlequin Duck. The observation of an adult male on October 8, and of a pair on October 14, near Piedras Blancas, has been recorded in detail elsewhere. (See Grinnell, Condor, XXIV, 1922, p. 180.)

Melanitta deglandi. White-winged Scoter. Several large flocks totalling about 300 birds were seen flying beyond the surf-line, October 2, between Morro and 5 miles north of Morro; "a few" in the Bay, October 14; 12 diving in the Bay, October 16; flock of 7, with one Surf Scoter, in the Bay, October 31.

One immature female (no. 29599) was collected by White October 22; weight 1164.7 grams; bill fuscous black; iris hazel; legs and toes light cinnamon drab; webs black; claws black.

Melanitta perspicillata. Surf Scoter. Records of but five individuals appear in the notes: one seen, October 22; three, October 27; one (in flock of seven White-winged), October 31—all in the Bay.

Two birds were taken. The sex of one was not determinable by dissection, but the bird's small size (weight 820 grams), the almost white middle under surface, the lack of any red color or swelling in the bill, and the stubby ends of the tail shafts indicate a female of-the-year (that is, in juvenal condition). The other is a male, apparently adult, with unworn plumage. The bill is, however, relatively undeveloped, and the white forehead spot is much smaller than it normally is. Weight 1120.2 grams.

Erismatura jamaicensis. Ruddy Duck. Two individuals were observed by White, October 18, in a small tule pond up the coast north of Morro.

Branta nigricans. Black Sea Brant. A local fisherman stated that these geese come into the Bay about November 15 of each year in large numbers, but are so wary that few are killed. Other inhabitants of Morro substantiated this statement. Two Black Brant were killed by a hunter November 6; and the next morning a large flock was heard by Dixon "gabbling" as they fed on the mud flats at the east end of the Bay.

Botaurus lentiginosus. American Bittern. Five birds recorded: two, September 19, in fresh water slough north of Morro; two, the next day in same general locality; one, September 23, near mouth of Morro Creek.

Ardea herodias hyperonca. California Great Blue Heron. Frequently observed from September 18 to October 27, about thirty individuals all told being mentioned

in the notes. The birds were found around fresh-water ponds and creeks, on the mud-flats of the Bay, and in the salicornia marshes. A female bird was collected, October 17, in the salt marsh two miles southeast of Morro.

On October 15, Dixon watched one bird asleep on the mud-flats with head and bill tucked back under wing. It did not move, even to shift a leg, for twenty minutes, and might have been depending on the neighboring Godwits and Curlews to give the alarm if danger threatened.

Casmerodius albus egretta. American White Egret. One lone individual seen by Dixon on the marshes of Morro Bay, September 23.

Nycticorax nycticorax naevius. Black-crowned Night Heron. Recorded the first day (September 19) and at intervals till almost the last day (November 4). Flocks of about 25 individuals were usual. On September 22, Grinnell routed about this number of birds from their roosting place in a clump of tall willows in the middle of a large area of smaller willows, near the mouth of Morro Creek. Four days later, visiting the same general locality he saw "an unending procession" as it "began to leave the roost in the willows at late dusk, with variously intoned 'squawks'; all headed up Morro Creek bottomlands, not toward the beach." White recorded two sizeable flocks, the second, observed November 1, "flying in a straggling fashion to the upper end of the Bay." Two birds were heard at night, October 9, at San Carpofo Creek.

Rallus virginianus. Virginia Rail. One record only—a male (no. 29603) in new unworn plumage caught in a trap set for meadow mice in tules, one mile north-east of Morro, September 26. Weight 86.3 grams.

Fulica americana americana. North American Coot. "Mud-hens" are not mentioned in the notes as particularly common. One was seen September 19; fifteen, September 24; and one, September 25—all in fresh-water ponds or lagoons near the mouth of Morro Creek.

Phalaropus fulicarius. Red Phalarope. Three observed by Dixon, along with about 75 Least Sandpipers, one Baird Sandpiper, and about 12 Northern Phalaropes, September 23—all gathered to escape the strong breeze, in the lee of a dense growth of salicornia in a shallow tidal pond. White found four, October 21, swimming in a pond on the beach; and Grinnell noted five, October 24, on the beach at upper tide line. The latter were darting rapidly here and there on the sand catching kelp flies. Their movements were similar to those used by phalaropes when swimming and dabbling this way and that on the surface of the water. Their plumage was nearly complete gray, making the bodies when in flight "look plainly gray and white". In silhouette the bodies of the flying birds looked "thick through—not slender as in typical shore birds".

The two birds-of-the-year collected October 24 are in predominantly winter plumage. The female shows the smooth tinge of light ochraceous-salmon on fore-neck and behind the dusky auricular patch marking this sex in the juvenal plumage. Weight of male (no. 29606), 31.2 grams; of female (no. 29605), 39.8 grams.

Lobipes lobatus. Northern Phalarope. Flocks of about 15 were noted from September 19 to 29, by all three members of the party, on the Bay shore, and in both fresh-water ponds and tide-pools. On September 24, Grinnell saw "crowds" of them in the salicornia at the head of the Bay. Dixon recorded two, with three Wandering Tattlers, feeding on kelp flies on the beach two miles south of Piedras Blancas, October 8.

Two birds-of-the-year were taken, October 20 and 21, a male (no. 29608) and a female (no. 29607). Weight of male, 26.2 grams; feet and legs bluish gray. These specimens are closely similar in plumage, with entire under parts white save for grayish suffusion at sides of chest.

Recurvirostra americana. American Avocet. Not a common bird, only four individuals being recorded—at a brackish slough north of Morro September 19 and 22. One specimen (male, no. 29609) taken on the latter date had the feet and legs light bluish gray and bill black; weight 322.5 grams, lean. Gullet contained 21 little fishes, $\frac{5}{8}$ to $1\frac{1}{2}$ inches long, and a sand-flea.

Limnodromus griseus scolopaceus. Long-billed Dowitcher. On September 22, Grinnell recorded a hundred or more individuals; White, on October 6, saw "numerous

flocks"; by October 23, it was estimated by Dixon that the total number at Morro was only 30 birds, and he noted that they were then rapidly decreasing in numbers.

Dixon found the comparative approachability of these birds indicated by the following order in which shore birds took flight: Terns, Curlews, Godwits, Dowitchers, smaller sandpipers. In flight "they zigzagged back and forth like Least or Western sandpipers", and looked "comparatively dark". When a flock alighted the white patches on the middle of the back were "very striking". The preferred method of foraging of these birds was to probe in shallow water. One individual was seen by Dixon "to jump in and swim across a 4-foot channel that was too deep to wade", while the "rest of the flock flew across".

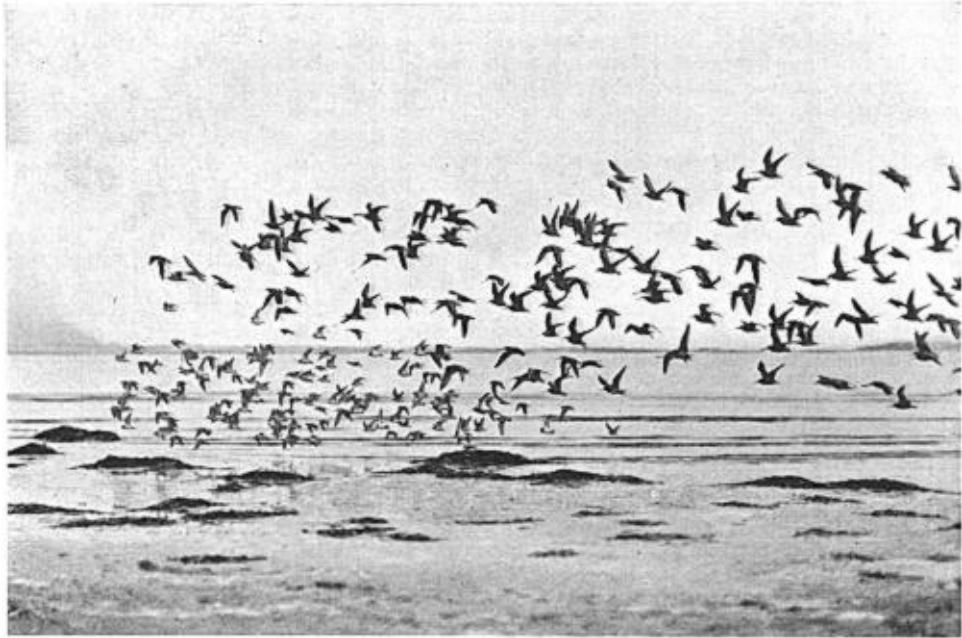


Fig. 29. LONG-BILLED DOWITCHERS IN FLIGHT (ABOVE SANDPIPERS); MORRO BAY, OCTOBER 4, 1918.

Of two immature females collected (nos. 29610-11) one weighed 107.5 grams; bill at base dark citrine, becoming dull black at tip; feet and legs dull citrine; iris dusky neutral gray. The other weighed 116.1 grams. An immature male (no. 29612) weighed 101.7 grams. The throats and breasts of all three specimens are generally brownish gray, with a dilute rusty tinge in the case of the two females.

Pisobia maculata. Pectoral Sandpiper. Two were observed by Dixon, September 23, partially hidden in the salicornia of a salt marsh at the mouth of Chorro Creek; only their heads, long bills and gray breasts showed.

Pisobia bairdii. Baird Sandpiper. Three were observed by the senior author, September 19, in a belt of kelp drift on the ocean beach north of Morro. One of these was taken, an immature male (no. 29614), with weight of 54.8 grams; feet plumbeous; bill black; iris hazel. What were probably the remaining two birds were seen the next day in the same neighborhood. Their much greater size as compared with the Least Sandpipers with which they part of the time associated was a good field mark; also the tawny chest band showed conspicuously. September 23 a lone bird was seen exactly where the first were seen in detached company of a few Least Sandpipers and Snowy Plovers. This bird, upon collection (no. 29613) was found to be an exceedingly fat female, weighing 60.3 grams; the bill, legs and feet were black.

Pisobia minutilla. Least Sandpiper. A common sandpiper at all times during the party's stay at Morro (specifically recorded September 19 to November 4). The total number was estimated, October 23 by Dixon, as 300. Flocks of from 8 to 250 individuals were recorded, these frequently being parts of mixed flocks, containing other small "peeps", Dowitchers, etc. This species was noted alike on the outer sea-beach and on the mud-flats and sandbars inside the Bay.

Dixon found the olive-green legs of the Least Sandpiper a reliable field mark. This field character was particularly helpful when binoculars were used.

While Dixon was photographing a flock of sandpipers September 23 in a salicornia marsh at the mouth of Chorro Creek he heard a blow struck and looking up beheld a Prairie Falcon (*Falco mexicanus*) poised over a dying Least Sandpiper. The rest of the flock took flight, swung about in compact order, and returned and lit, while the falcon was still hovering not three feet above them. The falcon, after three attempts to pick up the now dead sandpiper, left, evidently frightened by the human observer who was about 40 feet away. In attacking, the falcon slipped in close to the ground, and did not swoop down in the commonly reported manner.

Three specimens of the Least Sandpiper were taken (nos. 29615-17), all females. Two of them weighed 23.6 grams and 24.2 grams, respectively; the feet were dull green; nails and bill black; iris hazel.



Fig. 30. SANDPIPERS (MOSTLY WESTERN) ALIGHTING ON MUD FLAT LEFT BARE BY RECEDING TIDE; MORRO BAY, OCTOBER 4, 1918; MORRO ROCK, FOG-VEILED, IN BACKGROUND.

Pelidna alpina sakhalina. Red-backed Dunlin. First recorded on September 22 when the senior author watched ten or more on the mud-flats, bay side of Morro sand-spit. Last recorded on November 3 by White, who saw five on west shore of the same spit. The total number at Morro on October 23, as estimated by Dixon, was 250 individuals, and apparently then still increasing.

Flocks of from 4 to 10 birds seemed to be usual, though larger numbers were found in flocks with other waders. Dixon recorded 50 on October 6, with Dowitchers and smaller "peeps". On October 23 he saw a flock composed of Red-backed, Western and Least sandpipers numbering about 250 all-told. Four birds were observed by the senior author, October 14, near Piedras Blancas, in the vicinity of some Black Turnstones "and usually taking flight at their alarm, but quickly following a separate course and keeping together."

Three specimens were taken at Morro, September 22 and 29, and one near Piedras Blancas lighthouse October 14. Three females (nos. 29619-21) weighed 51.1, 48.0

and 53.4 grams, respectively; one male weighed 48.6 grams. Two birds (a male and a female) on which color notes were taken had bill, legs, feet and claws black. All are thought to have been birds-of-the-year.

Ereunetes mauri. Western Sandpiper. At all times found common about Morro Bay. Flocks of from 5 to 250 individuals were recorded, often mingled with other waders, when foraging. Estimated by Dixon on October 23 to well exceed in numbers the Least Sandpipers then at Morro.

Two immature birds were collected, a female (no. 29623) September 25, weighing 27.6 grams, culmen 26.9 mm.; and a male (no. 29622), September 22, weighing 22.3 grams, culmen 21.4 mm. Feet and bill in both, blackish. Red-edged feathers predominate in the dorsal plumage.

Calidris alba. Sanderling. Present from first to last, in flocks ranging from 12 to 20 birds, though the records do not indicate that the total number of individuals was at any time large. Dixon noted an increase in number, October 23. Records are as follows: September 20, about 12 "as usual, trotting back and forth at the surf line"; October 2, flock of 15, shore north of Morro; October 6, "numerous flocks" on ocean shore of Morro Bay sand-spit; October 23, fifteen, same location; November 3, about 20, west shore of sand-spit.

Two immature females (nos. 29624-25) were taken October 2; weights, 66.6 and 58.5 grams.

Limosa fedoa. Marbled Godwit. Numerous at all times during the party's stay at Morro, resorting mostly to the outer beaches but also congregating at low tide on the sandbars within the Bay. Prone to go in aggregations of from 20 to 50 individuals, though smaller groups were commonly seen. Total population around Morro estimated by Dixon on October 23 at 300.

Dixon noted that, next to curlews, godwits were the most wary of the waders. Flocks of 12 or so godwits would often use three or four curlews as sentinels. In contrast to the curlews, which foraged on the exposed flats, the godwits habitually probed in three or four inches of water, sometimes wading belly-deep and submerging the head and neck up to bend of wing.

The females are, at a distance, obviously larger than the males, with longer bills and shanks. Weights (in grams) of a series of eleven birds were: males, 361.6, 281.6, 380.7, 268.7, and 272.5, or an average of 313.0; females: 510.3, 420.0, 386.1, 447.9, 494.0, and 389.0, or an average of 441.2.

One male compared with Ridgway for colors of soft parts had the bill light brownish vinaceous on basal two-thirds, becoming black at ends of both mandibles; iris seal brown; feet and legs deep mouse gray; claws black. One female had bill pinkish at base, becoming black at end; feet and legs gray; iris hazel.

Totanus melanoleucus. Greater Yellow-legs. In September, two individuals were recorded on the 28th; one individual on the 29th. In October, four on the 8th; one on the 10th; three on the 14th; and eight on the 20th. The first two birds were found on the peninsula across the Bay; the eight last, on an island in the Bay one mile south of Morro; all the others, in a sand-dune-dammed pond one mile north of town.

Of the nineteen birds figuring in the above record, four were collected (nos. 29637-40), two males and two females. The latter are obviously larger, in body, bill and shank, than the former. Weights of males, 169.9 and 147.8 grams; of females, 182.4 and 176.6. Color notes for one male: bill, deep olive at base, dull black at tip; soles of toes and backs of legs aniline yellow; ankle in front citrine; iris dusky slate-blue.

Catoptrophorus semipalmatus inornatus. Western Willet. Present in fair numbers throughout the party's stay at Morro. Total number on October 23 estimated by Dixon at 175. Frequented both the open ocean shores and the marshy and sandy shores and sandbars of the Bay. Sometimes commensal with godwits.

Two specimens were taken October 2 and 3 (nos. 29641-42), both females. Weights, 340.0 and 375.1 grams. One had bill storm gray at base, tip black; feet and legs sky gray, claws black.

Heteroscelus incanus. Wandering Tattler. No tattlers were seen at Morro. At Piedras Blancas, near the lighthouse, on October 8, three were watched by Grinnell and Dixon. These birds were near one another on the rocky beach working over

a drifted mass of kelp. They gave violent ducking movements of the head, forward and recovery, every now and then, and practically all the time their hinder parts were in unstable equilibrium. When looked down upon, the tattlers were extremely difficult to see because of their absolutely uniform colors above. It was probably the same three birds that were observed in the same place, October 14, "feeding on the kelp flies which swarmed on the decaying rolls of kelp heaped up on the steep pebbly beach". One of the birds was collected, an immature male (no. 29643). Weight 147.2 grams, very fat; tarsi and toes, old gold; claws, black; bill, fuscous black, becoming light brownish olive at base of lower mandible.

Numenius americanus. Long-billed Curlew. The Long-billed Curlew was seen in unexpectedly large numbers in the near vicinity of Morro Bay. Flocks of from six to twenty-five individuals were commonly encountered along the ocean beach north of Morro, while from 25 to 100 were to be seen gathered together at certain stages of the tide on the mud-flats within the Bay.

The greatest aggregate number occurred at the time of our arrival, September 18; from that time on, an irregular but gradual decrease in numbers is apparent from a tabulation of notebook records. On September 19 two observers reported a total of 212 seen; on the 22nd three observers reported about 400 seen (of course a considerable duplication must be granted here); on the 25th, one observer saw 53; on the 28th, 40 seen by two observers—"less plentiful on the ocean beach of the sand-spit, 3 being the greatest number seen feeding together there while 25 were feeding together elsewhere." On October 5 one observer counted 30; on the 10th, 6 were seen; on the 12th, one observer saw about 20; on the 23rd, the total number of birds at Morro Bay was "estimated at 25"; on November 3 one observer saw 20. On the 7th, Dixon reported a "big decrease in numbers noted—a few birds found feeding in salicornia marsh two miles up the bay" instead of feeding on their accustomed mud-flats near the mouth of the Bay.

As regards field identification marks it was agreed that the chief ones were the long bill, the peculiar pinkish cast of plumage, and the very large size sufficient for distinguishing this species from all other waders. Curiously, not one of the smaller Hudsonian Curlew was seen throughout the period of the field work at Morro. That species had evidently entirely passed to the southward before September 18.

The two sexes in the Long-billed Curlew can usually be distinguished in the field. The female is noticeably the larger, with a longer bill and a much pinker flush over the body and wings. Besides the inferior size of the male it was thought that as a rule this sex shows more white on the wing coverts than does the female.

Long-billed Curlew were usually observed feeding in company with Marbled Godwits and Western Willets; and on such occasions the much taller curlews would "act as sentinels", and alarm the flock before approached well within gun-shot range. Further evidence of the wariness of this species was exhibited when Mr. Dixon was trying to take photographs; the birds took immediate alarm at the erection of a small burlap blind, and it was several days later before they would approach it or alight within camera range of it. Godwits, however, seemed to be only slightly concerned, and returned to the spot a few hours later. Of all the waders present the Long-billed Curlews were the least approachable, and in this respect they were out-done only by the larger of the terns. It was further noticed that the male curlews were more inclined to "circle about any strange object, and squawk more than the larger, female birds".

The birds collected were very fat, so were probably finding feeding conditions good. In the gulleets of birds collected were found several sand-crabs (*Emerita*): one held 3, one 5, and another 1.

When probing on the mud-flats of the Bay, the curlews would (according to Dixon) take a stand some distance back from the water's edge, while the dowitchers fed in the shallow water near the margin, and the godwits waded some distance from the shore, and probed in water 3 or 4 inches deep. The probing of the curlews was more gentle than that of the godwits which, when feeding in 3 or 4 inches of water, would thrust their heads down so violently that the entire head as well as the bill went under the surface of the water.

The probing of the curlews was on one occasion watched by Dixon from a distance of 150 feet. One of the birds stuck its long bill down into a hole and "twisted the bill around until it looked as though the bird was trying to stand on its head. After several seconds of violent effort the bird withdrew its bill, bringing forth a long marine worm. The mud bars are perforated with these worm holes which are spaced about 6 or 8 inches apart. The holes are intercommunicating at a depth of 3 or 4 inches below the surface, and, in feeding, the curlews seem to keep probing until they chase the worm into a corner or else take him by sudden surprise. Three birds are frequently seen working within a six-foot circle, and their efforts may thus be to some extent cooperative."

One female curlew was found eating grasshoppers in a pasture near a road $4\frac{1}{2}$ miles south of Morro. The bird was not badly frightened by the approach of an automobile, but flew a short distance inland and continued search for grasshoppers.

Colors of soft parts of five Long-billed Curlew examined shortly after shooting agreed closely irrespective of sex as follows: Upper mandible brownish or brownish plumbeous; lower mandible brownish lead-color at end, becoming pinkish at base; feet and legs ashy gray; iris hazel. The weights and measurements of the fifteen specimens taken, together with a discussion of variation within the species, have been recorded elsewhere (see Grinnell, Condor, xxiii, 1921, pp. 21-27).

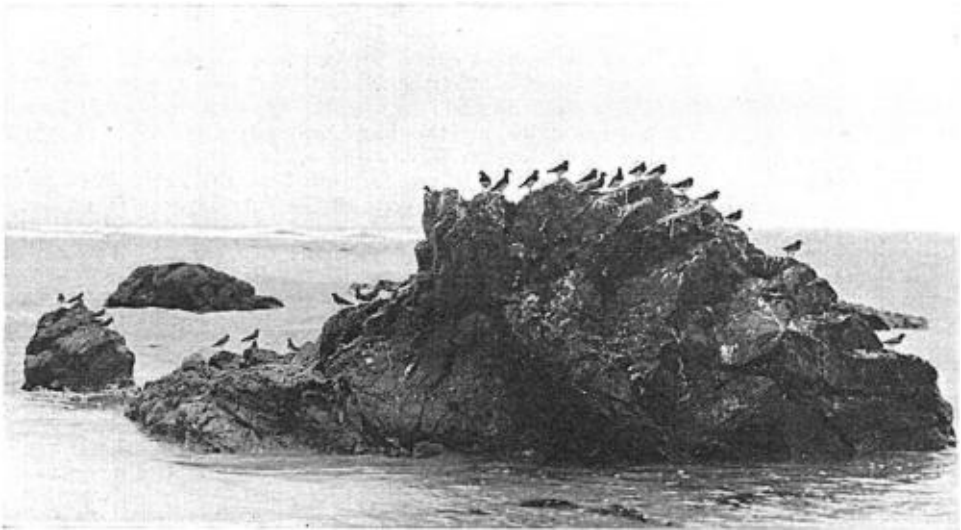


Fig. 31. BLACK TURNSTONES ON ROCKS, RESTING AT HIGH TIDE; TWO MILES SOUTH OF PIEDRAS BLANCAS, SAN LUIS OBISPO COUNTY, CALIFORNIA, OCTOBER 8, 1918.

Squatarola squatarola. Black-bellied Plover. About 100 were observed September 19 on the mud-flats in Morro Bay, opposite town. One of these was a cripple and was still largely in summer plumage, with striking black throat and belly. Twenty were seen two days later near the same place. Other records: flock of 6, October 1, one mile north of Morro; "a few", with dowitchers and godwits, October 4, on sand-bar in Bay; "numerous flocks", October 6, ocean shore of sand-spit; 113, October 23, on the sand-spit; about 20, November 3, west shore of sand-spit. The 113 birds observed on October 23 were thought by Dixon to include all the individuals in the vicinity of Morro.

Pluvialis dominica dominica. American Golden Plover. One record only—an immature male (no. 29659) taken by White, September 29, on the outer beach two miles north of Morro. No other waders accompanied it. Weight, 124.4 grams; bill, chaetura black; feet and legs deep dull gray.

Oxyechus vociferus vociferus. Northern Killdeer. Rather commonly met with, both along the shores and mud-flats within Morro Bay, and in plowed fields and moist

grassy tracts inland. Six specimens were collected (nos. 29660-65), all birds-of-the-year; weights (in grams) as follows: 84.9 and 82.4 (females); 85.7, 90.0, 77.7 and 78.2 (males).

Charadrius semipalmatus. Semipalmated Plover. First recorded on October 5 when a pair was observed by Dixon feeding on the mud-flats of the Bay. On November 2, four more birds were seen, by White, on mud-flats in a pond one mile north of Morro. Two of these were collected—immature males (nos. 29666-67), with weights of 48.6 and 44.6 grams, respectively.

Charadrius nivosus nivosus. Western Snowy Plover. Constantly present about the Bay, mostly scattered along the outer ocean beach, where usually foraging well up toward the dunes from the surf-line. Up to 40 were counted in a single day's rounds. One adult male collected weighed 41.0 grams; two immature females, 41.0 and 40.0. Legs of the male were gray; feet and claws plumbeous. The adult male, taken September 22, has the remiges in process of molt; two old worn outer primaries remain in the right wing, one in the left.

Arenaria melanocephala. Black Turnstone. Not recorded close to Morro. Near Piedras Blancas, on October 8, a flock of about 200 was met with by Grinnell and Dixon; and, on October 14, about 30 were seen in exactly the same place. The birds would perch on points of kelp-covered rocks on the steep beach 2 or 3 yards within the breaking surf. The flock of 200 on taking wing, gave rapidly uttered sputtering cries, insistent, but the volume swelling and dying, till the birds got settled again; then they were mostly quiet. These birds again took flight, at the appearance of a Duck Hawk, broke into smallish flocks, and maneuvered in wild rapid flight high overhead, with shrill clattering cries. They quieted down only after the hawk was well out of sight. When wholly undisturbed, individuals were seen to capture and eat kelp flies.

Museum of Vertebrate Zoology, University of California, April 9, 1925. [Revised by the senior, and surviving, author, December 7, 1927.]