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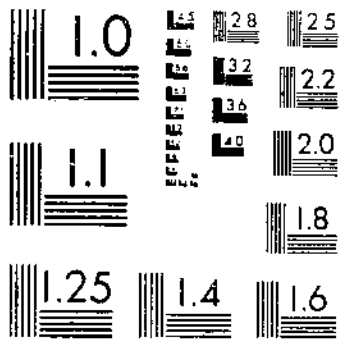
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OUR MIGRANT SHOREBIRDS IN SOUTHERN SOUTH AMERICA

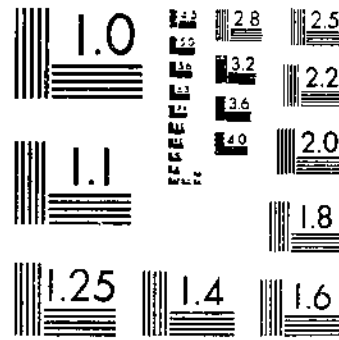
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NATIONAL BUREAU OF STANDARDS-1963-A



UNITED STATES DEPARTMENT OF AGRICULTURE  
WASHINGTON, D. C.

## OUR MIGRANT SHOREBIRDS IN SOUTHERN SOUTH AMERICA

By ALEXANDER WETMORE, Assistant Secretary, Smithsonian Institution, formerly Biologist, Division of Biological Investigations, Bureau of Biological Survey<sup>1</sup>

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### EXTENT OF INVESTIGATIONS

The extended journeys that are made each year by some shorebirds between their breeding grounds in the northernmost parts of North America and their winter homes in southern South America have been one of the marvels of bird migration in the New World. During the period of settlement in the eastern half of the United States these birds—the group of waders including phalaropes, snipes, sandpipers, and plovers—were extremely abundant, but excessive shooting, particularly in spring, led to such a great decrease in their numbers that when the treaty covering birds migrating between the United States and Canada was put into effect, it was necessary to include the majority of them in the list of birds protected at all seasons. Of this entire group open seasons were allowed only on woodcock, Wilson snipe, greater and lesser yellowlegs, and black-bellied and golden plovers. All others were protected throughout the year. Since the passage of the migratory-bird treaty act, yellowlegs and the two plovers mentioned also have been added to the species protected by yearlong close seasons. With attention thus directed to the decreasing numbers of waders, the question naturally arises as

<sup>1</sup> Doctor Wetmore was transferred from the Department of Agriculture on November 19, 1924, to become superintendent of the National Zoological Park, Washington, D. C., and on April 1, 1925, was appointed assistant secretary of the Smithsonian Institution.

NOTE.—This bulletin gives an account of the present status in southern South America of the snipes, sandpipers, and plovers that migrate in winter from North America to points south of the Equator. It will be useful to sportsmen, conservationists, naturalists, and others interested in shorebirds and their protection. The South American views reproduced are from photographs by the author.

to what present conditions our shorebirds encounter in their winter homes. The following report embodies briefly the results of an investigation made by the writer of the species of migratory waders that pass from Canada and the United States to Argentina, Uruguay, Paraguay, and Chile.

The field work on which this report is based occupied the period from May 29, 1920, to May 19, 1921.<sup>2</sup> Actual field investigations in Argentina began on July 4 in the Chaco, a region where marshy savannas alternate with tracts of forest that extends west of the Parana-Paraguay River system from Sante Fe, in northern Argentina, to Bolivia. Observations were made in the Territory of Chaco in July, in the Territory of Formosa in August, and in the Chaco of Paraguay as far as latitude 22° S. in September. The southward migration of our shorebirds opened with the arrival of the lesser yellowlegs at Las Palmas, Chaco, July 31, and reached its height during September when the writer was in western Paraguay.

The wintering grounds of shorebirds on the open pampas of the Province of Buenos Aires (figs. 1, 2, and 3, A) were covered in October, early November, the middle of December, and the first week in March; similar country in Uruguay was visited in January and February. During the latter part of November and the first part of December travel was extended to northern Patagonia in the Territories of Rio Negro and Neuquen west to the base of the Andes, and in March to the eastern foothills of the Andes and the level region at the eastern base of the mountains in Mendoza. (Fig. 3, B.) During the first part of April the journey was continued north into the Province of Tucuman, and on April 22 across into Chile, where work terminated after a week at Concepcion on the coast north of Valparaiso. (See map, fig. 4.) Original plans called for travel in southern Brazil, but this was omitted because of insufficient time during the period when migrant shorebirds were present.

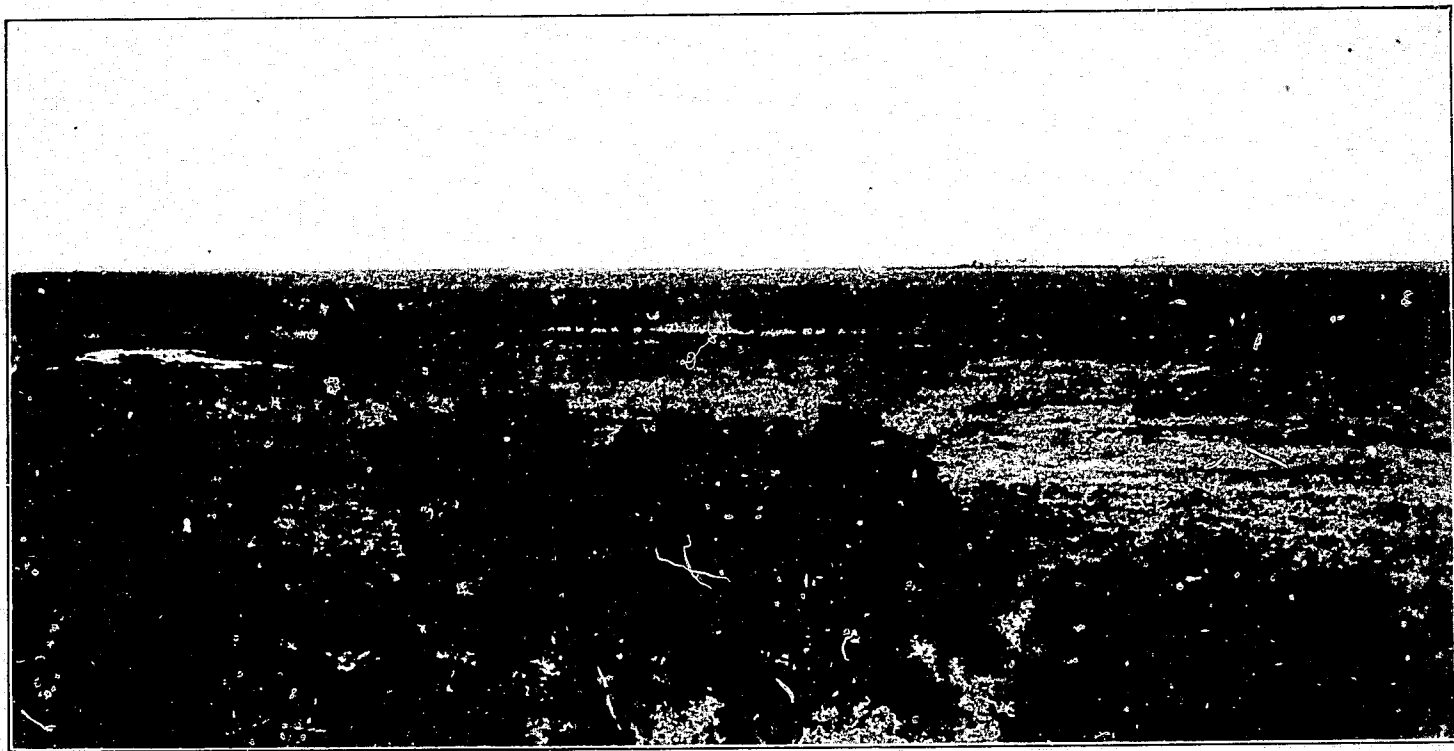
Northward migration among waders began at the end of January and gained in volume through March and April. The majority had moved from their wintering grounds when field work closed at the end of April.

#### MIGRATION OF SHOREBIRDS FROM NORTH AMERICA

Of the many North American shorebirds there are only 12 species that in their southward migrations do not reach South America. Twenty-three forms are found in winter from the southern United States southward to South America, in some cases extending as far as Patagonia. Four more leave our coasts to migrate south through the Pacific islands. Ten others (perhaps twelve, as the winter range of the red and northern phalaropes is not certainly known) retire wholly to southern South America.

In the category of those found in winter only south of the Equator is one species, the golden plover, that is considered a game bird; while of the others on the game list, the black-bellied plover, greater and lesser yellowlegs, and the Wilson snipe, range south into South

<sup>2</sup> A more extended report on all the birds observed during this period is found in the following: WETMORE, A. OBSERVATIONS ON THE BIRDS OF ARGENTINA, PARAGUAY, URUGUAY, AND CHILE. U. S. Nat. Mus. Bul. 133, 448 p., illus., 1926. (For sale by the Superintendent of Documents, Government Printing Office, 65 cents.)

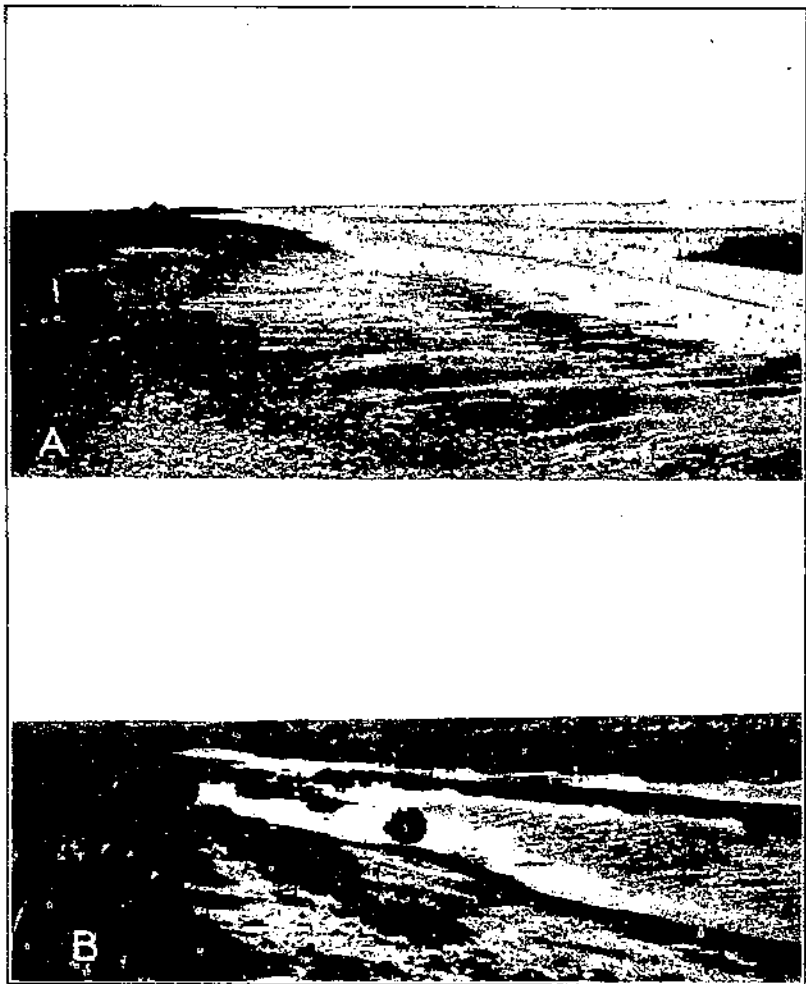


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FIG. 1.—Typical view of level pampas in eastern Buenos Aires. Much of the land is low or marshy and attractive to many shorebirds. From the mirador at Estancia Los Yngleses, Lavalle, Buenos Aires, October 30, 1920

America. The woodcock remains as the only species of shorebird hunted as game that does not in part cross the Equator during its southern flights.

The pampas and coasts of the southern part of South America are among the important areas concerned in the welfare of our



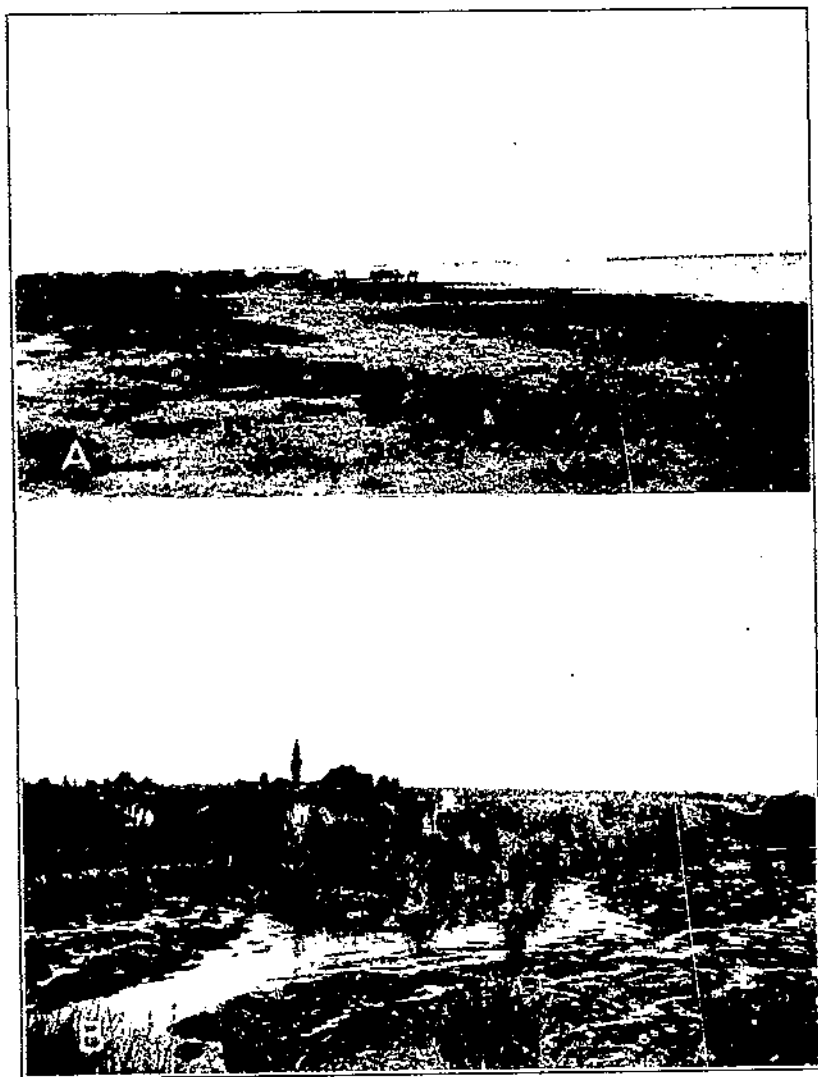
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FIG. 2.—A. Mudflats at mouth of tidal stream, eastern Buenos Aires. The haunt of hundreds of migrant sandpipers. The dark spots are large crabs. Rio Ajo, below Lavalle, Buenos Aires, November 15, 1920. B. Marshy arroyo in the central pampas. Yellowlegs and other shorebirds here find shelter from the force of the winds. Carhue, Buenos Aires, December 13, 1920

shorebirds, since, of the entire list, no fewer than 24 species pass as far south as Argentina and Chile.

Through the United States the fall migration of shorebirds begins early, and many of these birds continue south toward their winter homes at a comparatively rapid rate. In 1920, the southward movement opened on July 31 with the arrival of the lesser

yellowlegs on lagoons near Las Palmas, Chaco. The next species noted, the solitary sandpiper, reached the town of Formosa, on the Rio Paraguay, on August 23. The first week in September, when the writer had penetrated north to Puerto Pinasco on the



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FIG. 3. A. Alkaline lake shore in the central pampas. The resting place of many sandpipers, Laguna del Monte, near Guaminí, Buenos Aires, March 4, 1921. B. Muddy cienaga near eastern base of the Andes Mountains. A marsh attractive to yellowlegs and pectoral sandpipers, near Tunuyan, Mendoza, March 28, 1921.

Rio Paraguay, in northern Paraguay, migration began in earnest, and a steady stream of sandpipers and plovers passed southward through the Chaco all the month. The movement was observed as still in full force during October in the pampas of eastern Buenos



Aires, and it continued without appreciable abatement until the close of the first week in November. By the middle of November arrivals from the north had ceased, and shorebirds were settled on their

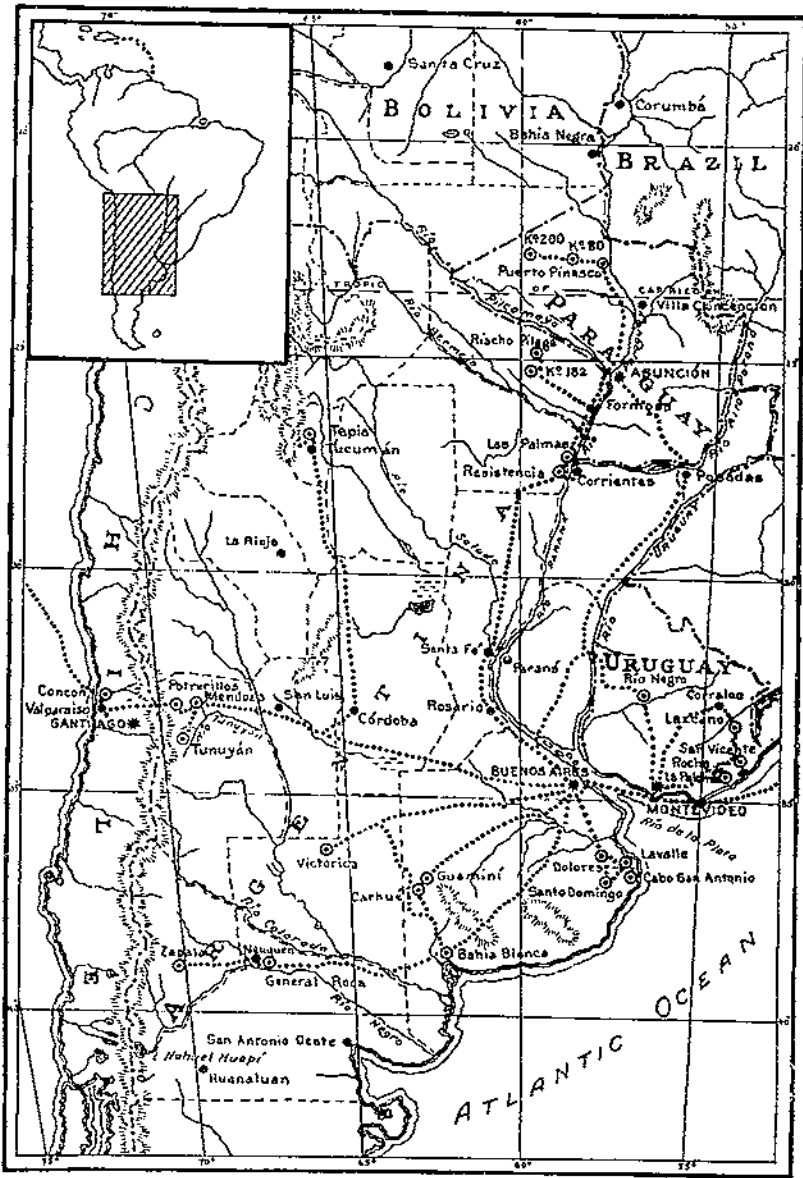


FIG. 4.—Southern South America, showing the routes of travel (heavy dotted lines) and chief collecting localities from which data were obtained for the present report on North American migrant shorebirds. (From Bul. 133, U. S. Nat. Mus.)

resting grounds, though throughout the pampas heavy storms that filled small pools and water holes, previously dry, were followed by the sudden appearance of yellowlegs and other shorebirds. These

instances, however, were not true migrations, but mere wanderings of individual birds in their winter home as new and profitable feeding grounds were opened.

The northward migration began at the close of January, with a slight movement among golden plovers. Upland plovers in small numbers were moving northward through eastern Uruguay on February 7, and the next day there was indication of northern movement among pectoral sandpipers. The northern flight for these early individuals continues a considerable time, since their breeding grounds are not open until much later. Slow increase in this flight was observed during the remainder of February, and by the close of the first week in March, the northward movement was in full swing. The first week in April marked its height, and by the end of the month decrease was easily noted. Records show that many of the individuals that pass far north to breed may linger in the middle portions of South America until May. The northward flight in such cases is made at a rapid rate with comparatively little rest.

The main period of southward migration south of the Equator comes in September and October, or, as the seasons are reversed, in the spring season of the Southern Hemisphere. In moving south to the pampas, therefore, migrant shorebirds travel with the advance of spring in company with native migrants returning to their breeding grounds after a winter in the Tropics. Those sandpipers that reach the pampas of Patagonia early in September meet heavy storms and cold weather that may drive them northward again, though many brave the weather until it moderates. For these wanderers from a northern breeding area the southern summer is a period of rest, and not until February is there pronounced desire among them to return to the north. The cold fall weather of February and March in Patagonia drives them rapidly northward again, and by April large numbers are passing through the temperate middle regions toward the Equator.

Thus, the southward flight of these travelers begins with the northern fall and follows the southern spring to the south, while the return journey, begun in the austral fall season, continues north of the Equator with the advance of northern spring.

During their extended flights individuals of certain species may be scattered over a tremendous range. On September 6, 1920, the date on which the first golden plovers reached the Chaco, west of Puerto Pinasco, Paraguay, golden plovers were observed in small numbers by a Biological Survey party under Francis Harper on Lake Athabaska in northern Alberta, Canada. On this day, therefore, the species was spread across many thousands of miles of the earth's surface.

#### PRESENT ABUNDANCE OF OUR MIGRANT SHOREBIRDS

A brief outline of the present status of the shorebirds that come into Paraguay, Uruguay, Argentina, and Chile as migrants from North America is given in the following paragraphs. Twenty-four species of plovers, sandpipers, and phalaropes are included, a part of which occur more or less casually, or are found mainly on the coasts of Chile and Patagonia in regions not visited by the writer.

In retrospect, at the close of extended field work in this area, the writer was somewhat disappointed in regard to the number of individual waders seen. The abundant flocks of godwits, plovers, and sandpipers of the seventies have disappeared, and though a number of species were common they were distributed through so vast an area that comparatively few were seen at any one time. Strangely enough the white-rumped sandpiper, little known to most North American ornithologists, was the one most abundantly and commonly recorded in the pampas of Argentina.

Scientific names of the birds in the following annotated list are in accordance with the third edition of the A. O. U. Check-list (1910)<sup>3</sup> and its authorized supplements to date:

#### LIST OF SPECIES

The winter range and migration routes of the red phalarope (*Phalaropus fulicarius*) and the northern phalarope (*Lobipes lobatus*) are imperfectly known, though it is supposed that the majority spend the winter at sea, probably off the southern coasts of South America. They pass far south, the red phalarope having been recorded from the Falkland Islands and the northern phalarope from Patagonia. Both are of casual occurrence in Argentina, as is the case in the interior of the United States. On their breeding grounds both species are abundant, and great flocks are observed at times in North America during migrations. These two species have suffered little from the crowding of civilized man, since both nest in the Arctic regions and winter in some unknown section of the Southern Hemisphere.

The Wilson phalarope (*Steganopus tricolor*), named originally from Azara's description of one brought to him in Paraguay, is a regular migrant in Argentina and probably occurs there in greater numbers than has been supposed, since after the breeding season it is in an inconspicuous gray winter plumage that has little to distinguish it from small sandpipers, though it is readily detected among its companions if one is familiar with its soft calls. The Wilson phalarope arrives in the south as early as September (September 13, 1902, near Buenos Aires) and remains until February or later. The species is recorded west to Mendoza and from Paraguay south to the Falkland Islands. The writer encountered two small flocks on November 15, 1920, on extensive mud flats at the mouth of the Rio Ajo, on the eastern coast of the Province of Buenos Aires. From December 15 to 18 a few were found in the vicinity of Carhué, in western Buenos Aires, near saline lakes and in marshy pools on the pampas. They are molested only by pot hunters who kill all small birds.

The stilt sandpiper (*Micropalama himantopus*) is reported as fairly common, at least formerly, in the northern and eastern portions of the Province of Buenos Aires, especially near the city of Buenos Aires, and farther southeast in the vicinity of Lavalle, and is also recorded near Colonia and Maldonado on the coast of southern

<sup>3</sup>AMERICAN ORNITHOLOGISTS' UNION, CHECK-LIST OF NORTH AMERICAN BIRDS. Ed. 3, rev., 430 p., illus. New York, 1910.

Uruguay. In the Chaco of northern Paraguay, west of Puerto Pinasco, a flock of a dozen was noted on September 20, and until September 25 the birds passed regularly in southward migration in bands that at times contained as many as 40 individuals. The species has been considerably reduced and seems very local in its winter range, for later the writer was unsuccessful in finding it in Argentina. It has been recorded in that country from August 7 (1877) to February 24 (1909). The species is far from abundant but should be safe from actual extermination, since it is not particularly desirable to gunners.

The knot (*Calidris canutus*), recorded in small numbers along the eastern coast of Argentina from Barracas al Sur, Buenos Aires, to Tierra del Fuego, though formerly abundant in the United States, has been greatly decimated by hunting. Except in the immediate vicinity of the city of Buenos Aires, the bird life of the winter range of the knot has been little investigated, so that not much is known of the occurrence of this species. The writer found one individual in company with white-rumped sandpipers below Cape San Antonio, eastern Buenos Aires, on November 7, 1920, but did not encounter it elsewhere. Under present conditions the species is little molested in its southern resting range.

The pectoral sandpiper (*Pisobia maculata*) is one of the few migratory shorebirds that still reach South America in abundance. It winters regularly from southern Paraguay and Uruguay through Argentina as far as Puerto Deseado, Santa Cruz, and in Chile south to Cavanche. In Argentina it arrives by the end of August or the first part of September. In 1920 the writer observed it first on September 9, in the Chaco, west of Puerto Pinasco, Paraguay, and little flocks were seen regularly in southward migration until September 25. The birds travel south without delay, as J. L. Peters found them at Huanuluan, in western Rio Negro, on October 6 and 23, 1920, when spring had barely opened. In the Province of Buenos Aires the writer recorded pectoral sandpipers casually during October and December and again in March. Small numbers were observed in Uruguay during January and February, and on February 8 a few seen near Lazcano were evidently bound north on the return migration. Other migrants were recorded at Tunuyan, Mendoza, March 26, when the birds had completed their molt and were extremely fat. The species remains in Argentina in small numbers until late in April and has been reported casually in May. The pectoral sandpiper is one of those species that has been supposed to breed in the south, a belief for which there is no basis in fact. It is hunted to some extent, but is found singly or in little flocks on mud flats, ponds, or swamps distributed over so broad an area that it does not suffer extensively at the hands of gunners.

The white-rumped sandpiper (*Pisobia fuscicollis*) is to-day the most common of the migrant North American shorebirds in Argentina and is one of the few that, to judge from old accounts, has not decreased decidedly in numbers. It is peculiarly a form of eastern South America, and only occasional stragglers have been found on the west coast. The species arrived near Puerto Pinasco, Paraguay, on September 6 and passed southward in numbers until September

21. During its resting season it is distributed chiefly from central Argentina south into Patagonia, though it is recorded from Uruguay in November. Muddy shores in open country were its only requirement in its choice of haunt, so that it was found indifferently on the broad, saline mud flats of the eastern coast of the Province of Buenos Aires or on the low shores of extensive lakes in the interior. In November, on the tidal flats at the mouth of the Rio Ajo, it was not unusual to see 2,000 or more in a day, and during December equally large numbers were recorded on the coastal flats near Bahía Blanca. At the same time the species was common about small inland pools on the pampas in the vicinity of Carhue, western Buenos Aires. The white-rump is reported universally through Argentine Patagonia, mainly near the coast; it penetrates regularly to the south to Tierra del Fuego, where it extends west into extreme southern Chile and crosses in some numbers to the Falkland Islands.

Northward movement among white-rumped sandpipers began the first of March, when numbers passed the large lakes in the vicinity of Guaminí, western Buenos Aires, driven up from the south by cold weather in Patagonia. Until March 8 from 75 to 2,000 were recorded daily, and the movement was still in progress when the writer moved on to other points. Flocks of males feeding on the open lake shores, animated by the warm rays of the fall sunlight, at times fought, chattered, and sang their twittering songs as an expression of the mating fever that was driving them on their long journey to the far-distant Arctic.

The Baird sandpiper (*Pisobia bairdii*) is less well known than related species in South America, perhaps through difficulties attendant upon its identification in the field. It has been recorded regularly in Chile and in western Argentina, frequently in the mountains about pools or wet meadows at elevations of 10,000 feet or more, though in times of rain it has descended to the plains. It is migrant in the Province of Buenos Aires and is found there occasionally when established in its resting range, as it is recorded from the Ajo district in eastern Buenos Aires during December.

The first of the Baird sandpipers arrive early in September and migration continues until the first part of November. J. L. Peters, in observations at Huanuluan, in western Rio Negro, recorded the first on September 12, 1920, and by October 21 found them fairly common in little flocks of from 3 to 25 individuals. The species remains until the end of April. The writer's only encounter with it was on March 5, 1921, near Guaminí, western Buenos Aires, when three were found in northward migration in company with white-rumped sandpipers. The limits of this species are imperfectly known, but from Peters's observations it may prove to range throughout Patagonia in the somewhat elevated area east of the mountains, as it is recorded south to the Rio Coy, and in addition goes casually at least to the Falkland Islands. The Baird sandpiper, in its southern range has as yet been little affected by hunting or by any changes in its natural habitat.

The semipalmated sandpiper (*Ereunetes pusillus*), ranges south through eastern South America but rarely occurs in the Argentine, being recorded only once, by Durnford in the valley of Rio Chubut, Patagonia. The writer noted one near Puerto Pinasco, Para-

guay, September 1, 1920, and a flock of a dozen in the same region on September 20. The species was there near the southern limit of its regular occurrence, as the bulk spend the months of boreal winter farther north.

The sanderling (*Crocethia alba*) is found regularly along both coasts of South America, ranging south in Chile to Cavanche and in Argentina to Tambo Point, Chubut. In Uruguay, it is tolerably common, and winters in Argentina in fair numbers on the Atlantic beaches of the Province of Buenos Aires. It arrives later than other shorebirds. The first one observed by the writer was on November 6, 1920, on the sandy beach below Cape San Antonio, eastern Buenos Aires, and on the following day three small flocks were recorded, about 20 in all. The Chilean coast was reached too late in the season to observe the main flight of these birds, but a flock of 25 was seen on April 29, in northward flight near Concepcion. The sanderling on the whole is little hunted at present and has an undisturbed range except where summer resorts have taken over a part of its beaches.

The Hudsonian godwit (*Limosa haemastica*), formerly one of the most prominent and abundant of the migrant shorebirds to reach the Argentine, has suffered at the hands of gunners north and south of the Equator to such an extent that it is now one of the rarer birds of this group. In the seventies and eighties of the last century Gibson<sup>4</sup> recorded it in eastern Buenos Aires in bands of thousands; in 1920, however, in the same area, only two flocks of four were seen during a period of nearly three weeks in the field. The Hudsonian godwit frequents mud flats and shallow ponds, where there has been little change in local conditions, but its flocking habit and large size have proved fatal. It was one of the earliest of migrants arriving in Argentina during July and August. Gibson noted one flock of a thousand as early as July 2 (1880). As many lingered in spring until late in May, and some remained in June, it was supposed for a long time that they bred either in Argentina, Patagonia, or the Antarctic continent, but no evidence to prove this assumption has ever been produced. It is probable that there were a considerable number of individuals of this godwit that did not breed each year, and that these were slow in migration. The species extends south in winter to Chiloe Island on the west coast and to the mouth of the Rio Chubut in the east, and, casually, goes to the Straits of Magellan and the Falkland Islands. The few that now exist appear to winter mainly in Patagonia. At Guamini, Buenos Aires, from March 3 to 8, 1921, there was a small flight from the south, and in all about 50 were observed. The species is now so rare as to be almost extinct, and its ultimate fate, even with absolute protection, is in doubt.

The greater yellowlegs (*Totanus melanoleucus*) in winter extends its range over a vast area in South America to the southern extremity of the continent as far as Tierra del Fuego. It is common and widespread through Argentina and Uruguay, where the bulk of the migrants arrive late in September or early in October, though recorded at times during August. The writer observed the first one on September 8 (1920) in the Chaco, west of Puerto Pinasco, Paraguay, and until September 24 individuals passed slowly in southward mi-

<sup>4</sup>GIBSON, E. FURTHER ORNITHOLOGICAL NOTES FROM THE NEIGHBORHOOD OF CAPE SAN ANTONIO, PROVINCE OF BUENOS AIRES. PART III. PHOENICOPTERIDÆ—GREBEÆ. Ibis (11) 2: 70. 1920.

gration. J. L. Peters, during the same season, noted the first one at the Estancia Huanuluan, in western Rio Negro, on October 6, and found them tolerably common after that date. From October to December greater yellowlegs were noted in small numbers at many localities in the pampas, particularly in the eastern part of the Province of Buenos Aires. In February they were common in marshy areas in eastern Uruguay, and during the first week in March passed northward in abundance through Guamini, western Buenos Aires, from resting quarters in Patagonia. They extend west to the Andes, as they were recorded near Tunuyan, Mendoza, from March 25 to 28. At Tucuman they were flying with other shorebirds on the evening of April 5. Near Concon, Chile, they were seen until April 26. This is another species that is found throughout the year in Argentina, but Argentine records for the months when the majority are on the northern breeding grounds come from crippled or diseased birds that are not breeding. The greater yellowlegs has been hunted to a considerable extent, but as it is less specialized or limited in its habitat than some of the upland shorebirds, it is holding its own though in somewhat diminished numbers. That it does not congregate in large flocks contributes somewhat to its safety, but to aid in its preservation it has been placed on the protected list in the United States by recent amendment to the regulations under the migratory-bird treaty act.

The lesser yellowlegs (*Totanus flavipes*) in southern South America is even more common than its larger relative. Like the greater yellowlegs it extends over a wide area in southern South America, but penetrates to greater altitudes in the mountains, being found about small lakes to an altitude of 10,000 feet. The majority arrive from the north in September and early October, but some come south rapidly, so that during the writer's work in 1920 it was noted as the earliest northern migrant. Three, flying slowly and appearing somewhat tired, were observed at Las Palmas in the north Argentine Chaco on July 31. Lesser yellowlegs were next seen west of Puerto Pinasco, Paraguay, on September 5, and were common migrants there until the end of the month. At Huanuluan, Rio Negro, J. L. Peters noted their arrival on September 19, 1920, and found them common after September 27. Individuals were observed at many scattered localities through central Argentina. Lesser yellowlegs were common in eastern Uruguay in February, and were found in migration at Guamini, Buenos Aires, early in March, and at Tunuyan, near the Andes, at the close of the month. In Tucuman, in northern Argentina, the species was noted until April 15, passing at night with other shorebirds on their return migration to the north. Like some other species lesser yellowlegs are occasionally recorded in Argentina in May, June, and July, but such birds do not breed and must be considered stragglers, unable for some reason to perform the long migration to their northern nesting ground. The species is hunted in Argentina, but will probably maintain its abundance, especially with the complete protection recently accorded it in the United States.

The solitary sandpiper (*Tringa solitaria*) is common as far south as the Province of Buenos Aires, and was seen on December 3, 1920, near General Roca, Rio Negro, an extension of the southern limit

as it had previously been known. It was first recorded by the writer on August 23, 1920, at Formosa, on the Paraguay River, in north Argentina. From September 6 to 25 it was noted regularly west of Puerto Pinasco, Paraguay. It was common in Uruguay in February, and was heard on the night of April 5, in flight over the city of Tucuman in company with other shorebirds. The species was widely scattered near pools and streams, as it is in migration in the United States. Though hunted to some extent it is holding its own, since it does not range in flocks. At times it is found among brush and weeds in flooded lowlands under heavy cover.

Winter ranges of the eastern and western forms of the solitary sandpiper are imperfectly known. The few collected by the writer in Argentina were of the eastern variety.

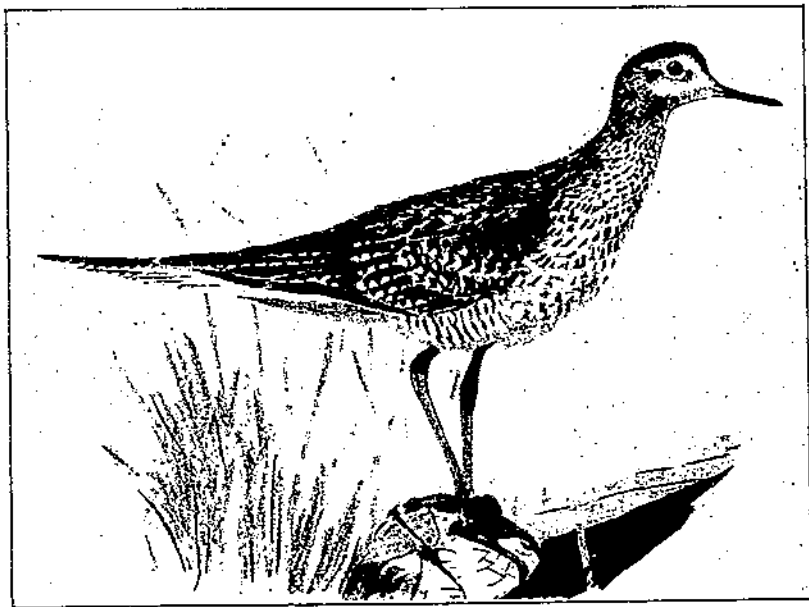


FIG. 5.—Upland plover, a winter resident on the pampas of Argentina and Uruguay that breeds in the central regions of the United States and Canada. From painting by Louis Agassiz Fuertes

The upland plover (*Bartramia longicauda*) (fig. 5) has its winter home restricted to the open plains of Uruguay and central Argentina, where it ranges south into the southern parts of the Province of Buenos Aires and the Territory of Pampa. Stragglers may penetrate to Patagonia, as one was taken by A. G. Bennett on Deception Island, in the South Shetland group, on February 8, 1923.<sup>6</sup> This, however, is unusual. The upland plover, formerly very abundant, arrives in Argentina at the close of September and during October and remains until April and May. In its present reduced numbers it is distributed over a vast area, where it is found only with difficulty and is to be recorded as rare. On September 29, 1920, a few were passing south along the Paraguay River at Puerto

<sup>6</sup> D[ABBENE], R. CAPTURA DE UN BATITU (*BARTRAMIA LONGICAUDA*) EN LAS ISLAS SHETLAND DE SUD. *El Hornero* 3: 197. 1923.



Pinasco, Paraguay, and others were recorded October 3 at Villa Concepcion, Paraguay, farther to the south. The species was observed in eastern Uruguay on January 23, 1921, and on February 7 may have begun an early return migration, as two seen on that date were traveling due north. Others were noted in northward flight at Concordia, Province of Entre Rios, Argentina, February 22, and at Guamini, in the western portion of the Province of Buenos Aires, on March 3 and 4. In the city of Tucuman, on the evening of April 5, the melodious whistle of the upland plover was heard 38 times, as the birds passed north with a host of other shorebirds that called constantly in their flight overhead. The whistled call of the present species, coming from the blackness of the skies, was recognized as a regular feature of April evenings in Tucuman, but all familiar with it commented on its decrease in recent years.

In the season of 1919-20 the upland plover was reported to have increased somewhat in abundance at Rosas in the Province of Buenos Aires, a circumstance due perhaps to protection in the United States and Canada. It can hardly be expected to regain anywhere near its former abundance, however, with increasing encroachment on its winter and summer ranges. Unfortunately, in Argentina it has replaced the Eskimo curlew as a table delicacy, and is so eagerly sought by gunners that its preservation in settled regions is doubtful. Those that remain must seek the pastures of remote estancias in order to survive.

The buff-breasted sandpiper (*Tryngites subruficollis*), a species greatly reduced from its former abundance, is found during the northern winter in the Province of Buenos Aires and near-by regions in central Argentina. It arrives at its resting grounds in October and leaves for the north in April or May. A single individual of this species was recorded west of Puerto Pinasco, Paraguay, on September 21, 1920, and another, on November 13, near Lavalle, Buenos Aires. From March 3 to 8, 1921, small flocks were observed near the shores of lakes near Guamini, Buenos Aires, where they were in passage toward the north. About 50 individuals were recorded at this last point, a small number when it is remembered that 50 years ago they were seen in flocks of hundreds. The species frequented open flats or muddy shores near lakes or channels, where it was subject to considerable hunting, as several of those seen had been crippled by shooting. From observations at Guamini, it appeared that the species has some resting station in northern Patagonia, perhaps near the mouths of the Rio Colorado and the Rio Negro, or some of the large alkaline lakes of that region. The small numbers remaining are preserved in some such place, but apparently the species is near extinction.

The spotted sandpiper (*Actitis macularia*) is a regular migrant in South America as far as Bolivia and southern Brazil, and on March 4, 1918, several were found by Mogensen at Concepcion, Province of Tucuman, in northern Argentina. On October 25, 1920, one was taken by the writer near the mouth of the Rio Ajo on the eastern coast of the Province of Buenos Aires, the southernmost point at which the species is known. It seems to be of only casual occurrence in the region under discussion in the present bulletin.

The Hudsonian curlew (*Numenius hudsonicus*) is known south of the mouth of the Amazon River only from the Pacific coast, where

it is common as far as Valparaiso, and ranges south to the island of Chiloe in southern Chile, and to Cape San Sebastian, Tierra del Fuego (one record). Most of these curlews had departed for the north when the writer reached Chile, so that the only one recorded was an individual seen on the beach at Concon on April 25, 1921.

The Eskimo curlew (*Numenius borealis*) in early days came to winter in the broad pampas of Argentina in great numbers, but to-day it is practically, if not actually, extinct. When established on its resting grounds, where it arrived in September, it frequented dry, open plains from northern Buenos Aires south into Chubut. It was found in Chile, south to the Straits of Magellan, and in the Falkland Islands, and remained in these quarters until March. The sad history of this handsome species is about complete. By 1900 it had become very rare through shooting and through encroachment on its natural habitat, and at the present time is on the verge of extinction. None were observed during the field work of 1920 and 1921.

The golden plover (*Pluvialis dominica dominica*) (fig. 6), familiar as an example of a species that performs an extended migration, passes the season of northern winter in the pampas of Argentina from southern Santa Fe and Cordoba south at least to Bahia Blanca in southern Buenos Aires, and probably penetrates as far as the mouths of the Rio Colorado and Rio Negro. It is reported north to southern Brazil and Uruguay and is found in Argentina from the end of August until April. Formerly so abundant that it occurred in flocks containing 200 or 300 individuals, at present it is hardly to be considered common.

In 1920, the writer recorded golden plovers in the Chaco, west of Puerto Pinasco, Paraguay, from September 6 to 25, while the birds were passing in southward migration. On October 23, in a drive of 75 miles between Dolores and Lavalle, in eastern Buenos Aires, small flocks were found scattered across the open pampas, and it was estimated that 260 individuals were seen during the day. Near Lavalle, 100 were seen on November 7, 150 on November 8, and 150 on November 15. On November 16, between Lavalle and Santo Domingo, a distance of 55 miles, only 30 were noted. A few were observed on December 15 between Saavedra and Carhue, and, until December 18, scattered birds were recorded near the latter place. The localities that have just been given, in the Province of Buenos Aires, are in the region where the species formerly ranged in great abundance.

The northward migration in 1921 began apparently with a small flock observed at La Paloma, on the southeastern coast of Uruguay, on January 23. Farther northward, movement through Uruguay was recorded at San Vicente, January 24 and 30, at Lazcano, February 7 and 8, and at Rio Negro, February 17. At Guamini, in the Province of Buenos Aires, 15 birds, migrants from the south, were seen on the evening of March 8; and on March 23 four were noted in flight at Tunuyan, near the base of the Andes, in Mendoza. On the evening of April 5, the whistle of the golden plover was heard with the calls of other shorebirds as they passed north over the city of Tucuman.

The golden plover in the south has been most common on open plains, but ranges to some extent on the mud flats of the coast. It is in this last area that the species may be expected to survive as the pampas become more closely occupied by man. These birds are hunted extensively and so many have been killed both in the north



FIG. 6.—Golden plover, a species that breeds in the Arctic regions and winters in South America and the Pacific Islands. The eastern form is confined in winter to South America. From painting by Louis Agassiz Fuertes

and south that their numbers have been greatly reduced. Though recorded in its resting range as only fairly common at best, the region where the golden plover is found at this season is extensive, so that the number of birds in existence is still considerable. Careful watch should be kept on its abundance.

The semipalmated plover (*Charadrius semipalmatus*) in winter comes south in small numbers to southern South America, where it has been recorded from the high mountains of Jujuy in northern Argentina, at Puerto Deseado, in the Territory of Santa Cruz, and on the coast of Chile.

The snowy plover (*Charadrius nivosus*) is reported as ranging south to Chile, near Coquimbo and Valparaiso, and even as far as the Straits of Magellan.

The surfbird (*Aphriza virgata*) ranges south in winter along the coast of Chile to the Straits of Magellan.

The turnstone (*Arenaria interpres interpres*) passes occasionally as far as the coast of Chile to Talcahuano if not farther.

#### CHANGES INCIDENT TO COLONIZATION BY MAN

Changes in ecological conditions in the plains region of southern South America in the past 40 years, particularly in Argentina, through the extension of settlements and development of agriculture, have been extensive. Early travelers and residents in the eastern pampas have described this region as a vast plain, in part marshy or swampy, in places grown with tall grass that often reached to a man's shoulder as he sat on horseback, or, near the isolated hills of the Sierra Tandil and Sierra Ventana, as a rolling tract covered with a variety of low herbage. Such conditions prevailed with little change until the seventies of the last century, when a tide of immigration flowing in the capital city of Buenos Aires gradually extended through the surrounding country and drove back before it the original inhabitants, the Indians. Extension of cattle grazing, the main industry at this early period, brought about a rapid change in the country invaded. Cattle tracks packed the more elevated marshy ground making it firmer and harder, while the winding trails made by the herds gave drainage to many pools and marshes. Herdsmen burned off dead grass in fall to clear the ground for tender new growth to come the following spring. Great changes were thus produced in the appearance of the country. The ground became drier in slightly elevated regions. Some species of grasses of luxuriant growth disappeared under the combined inroads of pasturing and fire, and for two or three years large tracts were more or less barren, so that the ground dried and cracked in the sun. Following this came other grasses that formed the short turf that to-day persists where the pastures have not been plowed and planted in extensive fields of wheat or other crops. Similar changes, through the natural drainage of swampy, marshy tracts, have been seen in the United States during the settlement of the prairie region in the West.

At the present time the marshy, open savannas of the Chaco region in northern Argentina and Paraguay seem to reproduce in a small way the conditions formerly almost universal through the broad, open pampas. Settlement is slowly encroaching in the Chaco, and many tracts were noted in newly settled areas that had been rendered temporarily barren through the combined effects of fire and grazing. In other regions, settled for a longer time, similar tracts were transformed into open pastures with shorter grasses and plant growth, while low swales in part were transformed to firmer ground. In

the settled regions of Argentina, large, four-footed game has disappeared. Deer, guanacos, and large armadillos have become scarce or have been exterminated except in the distant, scantily populated territories, or where protected, as on large estancias. Larger birds, as the rhea and the screamer (called locally the chaja), have followed, except where protected in preserves; large storks, geese, and ducks breed rarely, and only return in abundance during migration.

The changes in conditions on the pampas that have been outlined took place at the same time as similar changes in the prairie regions of middle-western North America. The effect on our shorebirds, combined with increase in hunting in the two regions, is shown in their reduced numbers and has proved serious to the species that inhabit open localities on the uplands or higher marshes. In the two decades, from 1870 to 1890, such species as the Eskimo curlew, the buff-breasted sandpiper, the upland plover, and the Hudsonian godwit were severely affected, and several others, though remaining common, became reduced in numbers.

The shorebirds that visit the Argentine from the north may be divided on the basis of their habits into three groups—(1) those that frequent upland or marshy prairie country, (2) those that occur mainly on coastal mud flats or the shores of large lakes, and (3) those found in small flocks or as scattered individuals at the margins of streams, pools, or lakes. Distinction between the three categories is marked by no hard and fast lines, since occasional individuals may be found anywhere about water, but in a general way these divisions hold.

The first group, including those species accustomed to the uplands, has been unable to withstand the combination of change in habitat and heavy shooting in the north and south, and so has greatly decreased. The species affected include the Eskimo curlew, the upland plover, and, in part, the golden plover and the buff-breasted sandpiper. The second group, with one exception, though suffering from heavy shooting, has been less seriously affected, since there has been less change in their haunts. The Hudsonian godwit, which combined large size with a tendency to fly in close flocks, has suffered more heavily than its smaller companions, so that now it is rare. The third group includes a variety of sandpipers that, while reduced in numbers, have an extensive winter range. They are so scattered that in few places are they hunted systematically, and there has not been sufficient change in their haunts to crowd them to any great degree.

#### PRESENT HUNTING OF SHOREBIRDS

In settled regions in Argentina, Uruguay, Paraguay, and Chile it was found that birds of all kinds were hunted extensively during the winter season. Hunters in small numbers were abroad constantly, while on holidays they spread through fields and marshes on all sides. Ducks, tinamous, snipes, stilts, sandpipers, thrushes, and apparently anything that wore feathers were considered game. Gulls, sparrows, flycatchers, and various marsh birds were killed in numbers. The ovenbird, or hornero, and the spur-winged plover, or *teru teru*, were the only birds that sentiment excepted, and these frequently suffered at the hands of some of the lower-class foreigners recently come to the country.

Methods employed in duck or snipe shooting were more crude than those used in the United States. Natural blinds, such as low banks, rushes, or vegetation were utilized as hiding places, but decoys to entice game within range were almost unknown, except that dead gulls were waved or tossed in the air to call up unsuspecting companions. Wealthy sportsmen employed dogs to hunt tinamous, but the use of these was unknown to the poorer class. It was customary to keep wounded birds alive, perhaps that the meat might not spoil, so that it was common to see men or boys on hunting expeditions carrying a luckless ibis, gull, or duck with a broken wing; on several occasions it was noted that such birds were kept alive throughout the entire day.

Gun stores in large cities were well stocked with firearms of American, English, French, and Italian makes. Single-barreled 16-gauge shotguns were favored weapons for general shooting, while lighter guns of 9 or 12 millimeter bore were chosen by those who hunted sparrows, thrushes, and other small birds. Shells loaded with black powder were in universal use, though cartridges charged with smokeless powder were available in the principal cities. Most hunters favored large shot, so that ordinary loads were filled with shot ranging from No. 4 to BB. Country men, not satisfied with these, frequently used lead slugs cut from a quarter to five-sixteenths of an inch in diameter and laboriously hammered until they were round. In the Chaco the writer saw old single-shot rifles of .45-.90 bore that may well have seen service in the days of the buffalo on our own western frontier. Occasionally a peon had made a pistol of one of these by sawing off the barrel 6 inches above the breech and cutting off the stock behind the triggers. It was said that such weapons did not carry straight for any distance but that they made a great deal of noise.

Settlers in the Chaco had greater opportunities for hunting than was the case in the thickly populated region of central Paraguay and the central Provinces of Argentina and Chile. The Paraguayan Chaco, except for the narrow fringe of settlement bordering the western bank of the Rio Paraguay, is still recognized as the range of various tribes of Indians who live almost entirely from products of the chase. Each tribe has its territory, recognized by its neighbors, where it is privileged to hunt and fish at will; during the dry winter season groups of these people congregate at large lagoons of permanent water, but when rains make water available through the country the Indians travel about in families or bands, stopping temporarily wherever fish or game offer a supply of food.

In 1920 the hunting of game animals was carried on by Indians only to supply bodily needs, and the available weapons were primitive. Bows of great strength and long arrows were used by many, while a few treasured single-barreled shotguns or occasionally an old Remington, Sharps, or Ballard single-shot rifle. The younger Indians were frequently expert with throw sticks—sections of heavy tree limbs from 20 to 35 inches long—which were hurled with speed and accuracy for distances of 40 to 60 yards. These were especially effective against birds that traveled in flocks and were used to advantage on bands of screeching parrots as they passed on the wing.

At the Riacho Salado, a stream in the central Chaco, dry or nearly so in winter, but with a broad, shallow bed of running water in

summer and fall, were hundreds of these throw sticks of various sizes gathered on low sand bars or behind low banks on either shore. From February to April, when shorebirds were passing northward in migrating bands, Indians resorted here for the hunting. As sandpipers and plovers passed in flocks the Indians hurled their throw sticks from concealment through the close ranks with deadly effect. Broken-winged and stunned birds were then retrieved from the water, together with the throw sticks, which for this use were made of wood light enough to float. The toll on shorebirds from these primitive sources is not great, since the number of Indians who hunt in this way is small.

#### PRESENT PROTECTIVE LEGISLATION

Legislation for the protection of birds in the republics of southern South America is in somewhat the same stages as in the United States 30 years ago. Farsighted men in the countries concerned, realizing the necessity for restrictive legislation relating to the killing of game birds and for proper protection for the invaluable insect-feeding species, have placed on the statute books a number of laws covering such matters, but the public in general has not yet been educated to their observance. Hunting seasons for tinamous are respected to some degree, but laws protecting the smaller birds are often disregarded. This laxity is due partly to the fact that extensive settlement and development, with consequent excessive hunting, has been comparatively recent, and partly to the large proportion of colonists from the south of Europe where bird killing is a sanctioned custom and where sentiment for the protection of birds, particularly the smaller species, is notably wanting.

#### ARGENTINA

Within the past few years in Argentina the question of the protection of birds has been given prominence by the organization of the Sociedad Ornitológica del Plata (Ornithological Society of La Plata), and the journal of this society, *El Hornero*, in practically every number has called attention to the value of birds to mankind and has suggested methods for the education of the public along these lines. Some of its articles have been copied in the daily press. The National Board of Education has introduced nature study in the schools to foster the idea of preservation of the native fauna through a better idea of the value to man of useful birds and animals, so that popular education along lines that will lead to better protection of birds and other native animals is under way and in time it will be an appreciable asset in the making and enforcement of protective laws.

In the code of laws of the Province of Buenos Aires in 1921 it was specified that the hunting season should extend from April 1 until August 30, that certain areas should be closed to hunting from year to year, and that small birds should not be molested, though exception was made for their capture alive for aviaries. Other provinces and the territories under military rule had similar regulations. Near the larger cities game birds were little molested, but no attention was paid to the killing of small birds hunted with small-bore guns.

In rural districts game laws frequently received scant consideration. It was not unusual to see shotgun cartridges advertised in local newspapers during the close season, and often hunters went out openly to kill what game birds could be found. To the credit of sportsmen it may be said that there was a sentiment against killing tinamous during the breeding season.

In the Territory of Formosa at that time it was considered necessary by the authorities to suspend the operation of game laws, except those protecting plume-bearing herons, in order to permit Indians living in the territory to procure meat for food. In actual operation the writer found that in the unsettled interior even the restriction protecting herons was disregarded. Indians made expeditions to heron rookeries to obtain plumes and killed the birds in large numbers. In August, 1920, at the Riacho Pilaga, Formosa, a party of Toba Indians was preparing for a two-week trip to a heron rookery on the Pilcomayo River, and in conversation with them the writer found them well informed regarding plume conditions, as they told that herons' eggs were just hatching so that plumes were "ripe." He learned later that they got a fair lot of feathers. Although regarded as contraband, heron plumes were taken by traders and shipped to Buenos Aires for sale. It was said that in 1919 the head cacique of the Tobas for that region had arranged organized hunting of plume birds, and that in behalf of his people he had sold 78 kilograms (1 kilogram is equivalent approximately to 2.2 pounds) of plumes for between 8,000 and 9,000 pesos.

#### URUGUAY

In Uruguay laws concerning the protection of birds are carried in the national code, and additional regulations are promulgated by an agricultural board called the Defensa Agricola. In 1921 the introduced house sparrow was the only bird held injurious; all other small birds were protected. A special decree prohibited the killing of gulls or the commercial use of gulls' eggs. The open season for game birds extended from March 30 to August 30, and shooting at night was forbidden. The general attitude toward protection of game birds (including plovers and sandpipers) and smaller species seemed excellent, though some illegal hunting was observed, mainly by boys and by foreigners settled in scattered colonies. Further regulation of hunting based on laws in force in the United States was planned.

#### PARAGUAY

In Paraguay a definite law for the protection of birds had been formulated but had not been passed, and restrictive regulations dealt mainly with the bearing of arms in the country. In the vast Chaco of western Paraguay, where civilized settlement was confined to a narrow line along the Paraguay River, measures for the protection of game were not yet required.

#### CHILE

In Chile there was an open hunting season for birds from March first until October, the main restriction being the necessity of obtaining permission to hunt on large estates. Hunters in many cases



killed everything from tiny flycatchers to gulls, often for the sake of shooting only, as the smaller birds were thrown aside.

As settlement increases in rural districts greater restrictions on the killing of birds in all these countries will become necessary and no doubt will be enforced as the people come to realize the value of birds to agriculture. Attention has already been drawn forcibly to the services of birds in the great locust invasions that are of periodic occurrence, and recognition of such assistance has brought about the protection of gulls in Uruguay. Similar facts, when better known, should in time restrict pursuit as game to those species fitted to withstand the killing of considerable numbers and should protect those of known value to man.

#### SALE OF GAME AND OTHER BIRDS

The sale of ducks and tinamous during the open season seemed to be a custom sanctioned by law, and during the hunting season quantities of these birds were offered for sale in the markets of Buenos Aires and were included on the bills of fare in the principal restaurants. Though the birds were not sold openly during the close season, numbers reached the hotels by hidden channels, so that in 1920 and 1921 birds were offered to the patrons of the principal cafés practically throughout the year. Prices were moderate and game birds were consumed regularly. In October and November, 1920, and February and March, 1921, tinamous, wild ducks, upland plovers, "small birds" (including a variety of perching birds), and snipes were offered daily in the restaurants and were readily available when ordered. Identification of the species as they appeared on the table was usually easy, as smaller birds were served with the tarsi, and sometimes the head, intact. The writer was told that the attempt to curb the sale of game was recent, as within the preceding two years birds had been sold openly throughout the year without hindrance.

In Uruguay the sale of game was governed by closer regulations, and illegal disposal had been largely checked. Formerly great quantities of game birds had been exported to Buenos Aires, only a few hours distant across the Rio de la Plata, but this had been prohibited, as was the preservation of game in cold storage for sale during the open season.

Many tinamous were offered for sale in the markets in Valparaiso and, as in other cities, quantities of the bodies of these and other birds were hawked about the streets by itinerant vendors.

The author was informed that a few tinamous were exported to London, but that the traffic was not heavy. Since 1921, however, many thousands of crested, spotted, and rufous-winged tinamous and a few other birds (as the spur-winged plover) have been imported in cold storage at the port of New York and have been distributed for consumption at various points in the Eastern States. The trade reached such proportions that sometimes a single shipment would contain as many as 360,000 birds. Becoming alarmed by the growth of this trade and the heavy tax caused by it on game production in the southern republics, Argentina has finally (1926) not only prohibited the export of tinamous at all times,

but also their sale and transportation in her own territory during the close season.

Though various small sandpipers may figure in the medley of small birds offered as food, the only North American species seriously affected at present by the sale of game is the upland plover. This species, under the name of batitu, has inherited the name and the epicurean fame of the Eskimo curlew, a species now practically extinct, and its ultimate fate is problematical. Upland plovers, formerly abundant, are available mainly in February and March, at a time when they are supposed to be on the protected list, but in 1921 they were offered regularly on the dinner cards in the best hotels. Occasionally their freshly cleaned bodies with head and tarsi attached were displayed as great delicacies to tempt the orders of favored customers.

Traffic in cage birds was extensive, and birds in cages were observed everywhere, particularly among the better class of people. Large, ornamental aviaries containing 30 or 40 birds were common, with species not of gregarious kind in smaller cages. About ranches and country places, parrots, rheas, spur-winged plovers, screamers, and others, captured while young and reared by hand, wandered fearlessly at freedom in company with domestic fowl.

In the larger cities were large bird stores where varieties of birds were offered for sale. These included a considerable assortment of native sparrows, cowbirds, blackbirds, tanagers, thrushes, flycatchers, spoonbills, rails, parrots, and paroquets, with additional forms from Paraguay and Brazil, and occasional Old World quail, thrushes, goldfinches, Japanese robins, and many canaries. Occasional cardinals (*Cardinalis cardinalis*) appeared to be of Mexican subspecies.

Itinerant peddlers sold birds of various kinds on the streets. Usually such men carried a large cage containing 15 or 20 cowbirds, Derby flycatchers, or others, while six or eight more clung outside to the top. These last were claimed to be "very tame," on the supposition that they had been reared by hand, but in most cases they were merely wild trapped birds, either cruelly blinded, or so stupefied by some drug that they did not attempt to fly.

Rarely the pectoral sandpiper was trapped and kept alive, but this was not a usual occurrence. The only North American migrant in great favor as a cage bird was the bobolink, which winters in the Chaco. In Mendoza and Tucuman, in March and April, 1921, bobolinks, under the name of charlatan, bestowed from the pied coat of the adult male, were sold in captivity in some numbers.

#### FUTURE OF NORTH AMERICAN SHOREBIRDS

The great changes that encroaching civilization has already wrought in the vast prairies of the temperate portion of South America, and their effect on the fauna, have been outlined in preceding pages. It remains to consider what the future may bring, especially with reference to North American migrant shorebirds. Some of the species concerned are now practically gone, and the outlook for certain others is gloomy at best. The eastern pampas and the Chaco, where migrant shorebirds have been most abundant, are fertile regions with rich soil and pleasant climate capable of supporting many times their present population. The greater part of

this land is held in large estates, so that rural population through wide areas is scant. The steady stream of immigrants to this section calls unceasingly for space, and the larger land holdings will be steadily divided into small farms with resulting increase in human inhabitants in country districts. The restricted range of birds and the increased persecution that this entails will exert much pressure on the avifauna, and will cause certain diminution in those few species of our shorebirds that are restricted to these areas in their winter range.

The Eskimo curlew now is practically extinct. The upland plover and the buff-breasted sandpiper can not hope to maintain their present slender numbers but inevitably will be still further reduced. Some decrease may be expected in the case of the golden plover, an upland species the haunts of which will be destroyed and the continuance of which will depend upon those individuals that winter on the barren flats of the sea coasts. Such smaller species as the sanderling, a bird that mainly inhabits coastal regions, and the white-rumped sandpiper, that is found on mud-flats everywhere, will be little affected. Nor will the changes to come be felt noticeably by the greater or lesser yellowlegs, as these have a vast distribution during the period that they are absent from their breeding grounds. Protective legislation can not prevent encroachment on their haunts but may do something to maintain the remnants of threatened forms.

The sale of game birds as food is an important question that merits deep consideration. This traffic requires firmer regulation than at present and must soon be abolished if the stocks of game are to be preserved. Experience in the United States has shown that no species of wild game bird can stand commercial exploitation. Invariably when it has been shown that money can be made in such business, trade in game birds increases until it threatens their existence, and when sale is permitted it is difficult to control such matters as close seasons, daily bag limits, and illegal hunting.

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