Article XXII.—A STUDY OF THE GENUS STURNELLA.

By FRANK M. CHAPMAN.

The genus *Sturnella* ranges from northern South America to the Plains of the Saskatchewan and includes two types or forms, one of which is dark, the other, light in color. The former, *Sturnella magna*, is distributed throughout northern South America, from Guiana to Bogota, and thence through Central America and Mexico, to the United States east of the one hundredth meridian and northward to the Great Lakes. It is also found in Cuba. In this wide area it is subject to considerable variation in color and size, characters which have formed the basis for the description of several races. These races, including the type form, with their ranges, are as follows:

1. *Sturnella magna* (Linn.). United States east of the one hundredth meridian, except southern Florida. (Based on Catesby's *Alauda magna*.)

2. *Sturnella magna argutula* Bangs. Southern Florida. (Type locality, Hillsboro County, Florida.)

3. *Sturnella magna hippocrepis* (Wagl.). Cuba. (Type locality, Cuba.)

4. *Sturnella magna mexicana* (Scl.). Tableland and temperate portions of southern Mexico northwards along the humid bases of the Sierras. (Type locality, Jalapa.)

5. *Sturnella magna inexpectata* Ridgw. East coast region of Central America and Mexico north to Vera Cruz. (Type locality, Segovia River, Honduras.)

6. *Sturnella magna alticola* Nels. Pacific coast of Mexico from Tonala, Chiapas, southward through the highlands, at least to Dueñas, Guatemala. (Type locality, Ocuilapa, Chiapas.)

7. *Sturnella magna meridionalis* (Scl.). Northern South America from Guiana to Bogota. (Type locality, Colombia.)

The lighter form, currently known as *Sturnella magna neglecta*, occupies the United States west of the ninetieth meridian and
ranges northward to the Saskatchewan and British Columbia and southward to Northern Mexico. It is subject to comparatively little variation, only one form of it having been described, the *Sturnella magna hoopesi* of Stone from the lower Rio Grande (type locality, Brownsville, Texas), which, through insufficient material, Mr. Stone erroneously believed to be the northern representative of *Sturnella magna mexicana*. The variations of *Sturnella magna* and *Sturnella neglecta*, *inter se*, present no unusual complications, but the relationships of the two forms to each other have long constituted one of the leading problems in the classification of North American birds, and its solution is the object of the present paper; the greatly increased collections from previously unrepresented areas, now giving the investigator opportunities which have before been lacking.¹

The radically different views which have been held by leading ornithologists, concerning the inter-relations of the eastern and western Meadowlarks, are well represented in the following quotations:

**Coues.**

Coues, 'Birds of the Northwest.'

"The case of *Sturnella magna neglecta* is settled and explained; magna shades directly into neglecta, and develops its peculiarities precisely according to the mean annual rain-fall, and consequently the average humidity of the atmosphere of the regions in which it resides. The change is imperceptibly effected; distinguishable examples sometimes occur together; the characters culminate in the most sterile regions."

**Ridgway.**

Ridgway, 'Manual of North American Birds.'

"Without much doubt a distinct species. The occurrence of both *S. neglecta* and *S. magna* together in many portions of the Mississippi Valley, each in its typical style (the ranges of the two overlapping, in fact, for a distance of several hundred miles), taken together with the excessive rarity of intermediate specimens and the universally attested radical difference in their notes, are facts wholly incompatible with the theory of their being merely geographical races of the same species."

In attempting to determine the exact relationships of *magna* and *neglecta* neither of the authors above quoted had material from which they could determine the relationships of *neglecta* to

¹ By far the most important of this recently collected material was secured by Dr. E. A. Mearns along our southern boundary, while acting as naturalist to the Boundary Survey; and by E. W. Nelson in Mexico, during his explorations for the Biological Survey.
the representative of *magna* on the tableland of Mexico, or at the southern limit of the range of *neglecta*, and in going into the subject in detail it at once became apparent that an attempt to learn the relationships of the Meadowlarks of the eastern and western United States involved a study of the entire group. We may, therefore, first consider *magna*, then *neglecta*, their range and variations *inter se* as a preparation for the study of their interrelations. It should be stated at the outset, however, that the material to which I have had access is far from satisfactory; and an explanation of the facts it apparently presents is to be regarded only as provisional. We need large series of breeding birds from northern Mexico, taken by a collector who is thoroughly familiar with the points involved, before we can reach conclusive results. In the meantime the following study is presented as perhaps embodying certain views not previously advanced.

**Geographical Variations of Sturnella magna.**

*Sturnella magna* (Linn.).—Our familiar eastern Meadowlark varies but little throughout most of the eastern United States. Specimens from the lower Mississippi Valley and eastern Gulf States, except Texas, average darker and this difference, which is slight, reaches its maximum in southern Florida. Northern birds have a longer wing but relatively shorter bill and tarsi than those from the south.

To the hardened 'splitter' these variations might seem deserving of recognition by name, but, in my opinion, with the possible exception of those of the south Florida bird, they are too intangible to warrant such a course.

*Sturnella magna argutula* Bangs.—The Florida bird, especially in the southern half of the State, is smaller than specimens from the northern States, the wing being about half an inch shorter, but the tarsus and culmen are of about the same length as in northern examples, and relatively, therefore, are longer.

A very careful comparison of specimens in the same stage of plumage fails to show any constant differences in color by which the Florida bird can always be distinguished from northern birds. The yellow of the underparts averages a shade deeper and the general tone of the upperparts is darker, particularly in
specimens from the southern part of the State, while the occasional presence of spots on the breast indicates an approach to the Cuban bird.

These differences were in part commented on by Allen in 1871, and in 1888, I referred the Florida bird to *mexicana*.

The excellent series of true *mexicana* which Mr. Nelson has since secured, and which I have been permitted to examine, shows that although agreeing with the Florida bird in size it differs in the narrowness of the pectoral crescent and in the coloration of the back, the feathers of which are less deeply tipped with chestnut and more widely bordered with bay than in Florida examples.

Mr. Stone has also pointed out these differences, and he concludes his study of the Florida bird by saying it is "certainly impossible to separate" it, and it has remained for Mr. Bangs to exhibit the courage which his predecessors have lacked by 'splitting' the Florida form under the name *Sturnella magna argutula*. If the application of this name be restricted to the isolated Florida bird, it may prove a convenient means of expressing the slight differentiation which that form exhibits. If, however, as its proposer suggests, it be applied to Gulf Coast and lower Mississippi Valley specimens, it will only result in the confusion which always follows our attempts to definitely name differences which do not definitely exist.

*Sturnella magna hippocrepis* (Wagl.).—The Cuban bird has a shorter wing and bill than the bird from southern Florida, but the tarsus is of the same length as in birds from that State. In the color and pattern of the upper parts it resembles the south Florida form, but the sides average more heavily streaked and black spots extend to the yellow of the breast and abdomen. The breast crescent in some specimens is very narrow, but in most cases is not relatively smaller than in *magna*. While the Cuban Meadowlark is isolated by an insular home from other forms of this genus it sufficiently resembles southern Florida examples to permit of the difference between the two being bridged by individual variation.

*Sturnella magna mexicana* (Scl.).—This form is smaller than *S. magna*, the wings and tail being shorter, but the tarsus is actu-
ally as well as relatively longer. In color, average specimens of *mexicana* resemble *magna* but differ in having the feathers of the back less widely bordered, laterally, with bay of a slightly brighter color than in *magna*.

In spring specimens of *mexicana* the chestnut tip of the back feathers largely disappears, when the greater width of the bay lateral margins and smaller black area of the dorsal feathers are more evident than in the fall, giving to specimens taken at this season a certain ruddy tinge wanting in *magna*. This difference is more evident in birds from the coast region (*inexpectata*) and less pronounced in specimens from the tableland.

The pectoral crescent in *mexicana* averages narrower than in *magna*, and the yellow of the throat shows a tendency to spread to the malar region, as in *neglecta*, this character being more strongly marked in specimens from the mountain region of southern Mexico to Costa Rica, in many of which the yellow of the throat is as widely spread as in average *neglecta*.

*Sturnella magna inexpectata* Ridg. — This is a small form of *mexicana*, which it resembles in color, but is more ruddy.

*Sturnella magna alticola* Nels. — Mr. Nelson has lately applied this name to southern highland representatives of *mexicana*, which have been alluded to above as sometimes having the sides of the throat yellow. Birds from the range assigned to this form appear to differ little if at all in size from true *mexicana*, but, as stated above, usually have more yellow on the sides of the throat.

*Sturnella magna meridionalis* (Scl.). — Enough specimens of the South American bird are lacking to satisfactorily determine its characters. It appears to resemble *mexicana* in color, but to have a much longer bill. Much variation is shown in the distribution of the yellow of the throat, which in some specimens is as widely extended as in *neglecta*, and in others as restricted as in *magna*. It is probable that when an adequate number of specimens of the South American bird have been secured from both the coast and highlands it will be found to differ much as do examples from southern Mexico.

**Summary.** — From this brief survey of the variations of *Sturnella magna* it is evident that throughout a range which reaches from South America to Canada it presents no marked variations in color. Indeed, to the untrained eye specimens from South
America do not differ appreciably from others from the northern United States. Southern specimens, as a rule, are darker in color and smaller in size, and, as is generally discovered when resident birds are compared with migratory ones of the same species, they have relatively longer tarsi.

Geographical Variations of *Sturnella magna neglecta*.

*Sturnella magna neglecta* (Aud.) — Throughout its wide range the western Meadowlark exhibits surprisingly little variation in color. Pacific coast specimens from north of California are slightly darker than the normal, but the difference is inconstant or only evident when series are compared. This darker color is also shown by specimens from the interior of British Columbia, a fact which suggests the possibility of these birds having extended their range into this region from the coast. Specimens from along the Mexican border have no yellow on the sides of the throat, as will be noted below.

*Sturnella magna hoopesi* Stone.— Mr. Stone's type, a March bird from Brownsville, Texas, is perfectly typical of *neglecta*, except in the absence of yellow from the sides of the throat, and this character is shown by most of the specimens from the Mexican boundary line, east of the Rocky Mountains, which I have examined.
Summary.—In view of the wide extremes of climate and greatly diversified topography of the area occupied by *Sturnella magna neglecta* the bird is remarkably constant in color, no form of this bird, with the exception of *hoopesi*, ever having received a name, a statement which implies unusual stability in size and color!

![Fig. 3. Tertials of Sturnella magna, Am. Mus. No. 67300, Patchogue, L. I., Oct. 4, 1888, Clarence A. Smith.](image)

**Differences between magna and neglecta.**

After this review of the geographical variations of *magna* and *neglecta*, *inter se*, we may approach the real problem of this paper, the inter-relationships of *magna* and *neglecta*. Are these birds representative, geographical, intergrading races of each other or are they specifically distinct? A satisfactory reply to this question is of the first importance, its bearing on related cases being far-reaching, and we can properly approach it only through a
clear understanding of the facts involved. In the first place, therefore, we may ascertain in detail the differences between typical examples of *magna* and *neglecta*.

**Color.**—The essential differences in color between Arizona and New York Meadowlarks are as follows: In *magna* the median and post-ocular stripes, the sides of the head and neck, margins of the feathers of the back, wings, and tail, the flanks, thighs, and under tail-coverts are mostly ochraceous; in *neglecta* they are cream-buff. In *magna* the black markings occupy a larger part of the feathers in which they appear than in *neglecta*, in which the brown areas are proportionately increased. In *magna* these brown areas are chestnut-russet; in *neglecta*, broccoli brown and raw umber. In *magna* the yellow averages deeper, and this difference is intensified by the ochraceous instead of the cream-buff fringe to the feathers of the underparts.

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1 C.f. Ridgway's 'Nomenclature of Colors.'
For five months after the post-nuptial molt is completed, in September, the differences in color above mentioned are perfectly diagnostic but later in the year they are less tangible.

Pattern.—Comparison of freshly plumaged specimens of *magna* and *neglecta* presents the following differences in pattern of marking: In *neglecta* the feathers of the interscapular region are more often crossed by two or three generally incomplete bars than in *magna*, but in both forms there is much variation in this respect. In *neglecta* the basal black of these feathers is more frequently laterally spotted with brown than in *magna*. In breeding birds the subapical bars have generally disappeared through abrasion, but in *neglecta* the incipient lateral bars are usually evident. In the tertials, and, more especially, the rump, upper tail-coverts, and median tail-feathers, the bars are much better defined and more constant in *neglecta*, the pattern of marking of the three last named areas, taken together, constituting the best single character separating the two birds, the differences in the disposition of the black color in the feathers of these areas being well shown by the accompanying photographs, Figs. 3–7. In *neglecta* spots on the sides and flanks average rounder, and the yellow of the throat spreads laterally to the malar region. In adult males the latter character is constant and characteristic except along our Mexican boundary (see antea under *S. m. hoopesi*).

Young birds.—Young birds, in juvénal plumage, present essentially the same differences in color which distinguish the adults.
Fig. 6. Tail-feathers of *Sturnella magna*, Am. Mus. No. 67300,♂, Patchogue, L. I., Oct. 4, 1888, Clarence A. Smith.

Fig. 7. Tail-feathers of *Sturnella magna neglecta*, Am. Mus. No. 54243,♂, Ft. Verde, Ariz., Dec. 26, 1887, E. A. Mearns.
In pattern, however, it is worthy of special note that in this plumage the median tail-feathers and coverts in *magna* show a strong tendency toward the barred pattern of *neglecta*; five out of fourteen specimens of *magna* agreeing with *neglecta* in this respect, while of five young specimens of *mexicana* all have the tail-feathers and coverts barred as in *neglecta*; a fact which suggests that the barred type of marking is the older.

**Seasonal change in color and pattern.**—The fact that Meadowlarks have only a post-nuptial molt and that when the breeding season arrives, wear and fading have deprived their plumage of its most characteristic colors and markings, greatly complicates the study of their relationships. The fall molt is concluded in September and from that month until January there is not sufficient change in plumage to interfere with the proper identification of specimens. After January, however, fading and wear often so alter a bird's appearance that its identity cannot be determined with certainty. It follows, therefore, that the differential characters of these birds are best exhibited in the fall and are least apparent in the breeding season, an unfortunate condition of affairs as every systematist will readily recognize.

**Song.**—Some advocates of the specific distinctness of the eastern and western Meadowlarks have attached much importance to the marked and well-known differences in the songs of these birds, and while these differences are doubtless of value in making field identifications, they should not, I think, be given
importance by the systematist. Song is largely if not wholly an uninherited character and is subject to great individual and geographical variation. In both *magna* and *neglecta* this statement is unusually well illustrated by the wide range of variation occurring in their respective songs. Dozens of strikingly different songs of *neglecta* have been recorded, its vocal powers have been described as being "a husky whistle" and as excelling those of the Nightingale; and while this difference is no doubt partially in the ear of the hearer, it nevertheless attests a wide range of variability.

Similar differences are to be observed in the eastern Meadowlarks. The song of about one tenth of the birds in south Florida is decidedly unlike that of the average type of song of the northern Meadowlark, and is said to approach that of *neglecta*. In Cuba, however, although the Cuban bird so closely resembles the southern Florida form, the Meadowlark song is only a wheezy chuckle, resembling more the song of a Dickcissel than that of a Meadowlark, though, as I have lately been informed by Mr. William Palmer, it improves toward midsummer.

If we were to rely on song, therefore, we should suppose the southern Florida and Cuban birds to be widely separated, whereas they are closely related.

**RELATIONSHIPS OF *magna* TO *neglecta*.**

Having ascertained the characteristics of *magna* and *neglecta* and the differences between typical representatives of these two forms we are prepared to approach the subject of their relationships by an examination of specimens from the area where their ranges come together.

*Minnesota.*

Fort Snelling.—*S. magna*, Am. Mus. Nos. 55706–55709, April 17, four specimens; No. 55710, April 23; No. 55699, May 8; No. 55711, May 18.

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1 *Explanation of Abbreviations.*

B. S. = Biological Survey.
F. M. C. = Coll. Frank M. Chapman.
G. B. S. = Coll. George B. Sennett.
O. B. = Coll. E. A. and O. Bangs.
W. B. = Coll. William Brewster.
S. m. neglecta, Am. Mus. No. 55714, April 14; No. 55705, April 17; No. 55715, May 15; No. 55716, May 31; No. 55705, Oct. 17.

Non-typical specimens: Am. Mus. No. 55712, May 18, has the tail of typical neglecta, but the tail-coverts, rump, and rest of the plumage are those of true magna. Am. Mus. Nos. 55702, 55704, 55713, all males taken September 30, approach neglecta in the pattern of tail markings and in being somewhat paler than average magna. Am. Mus. No. 55703, September 30, approaches neglecta more closely than the preceding, in the pattern of the tail, tail-coverts, and rump, and in color; in fact, it may be described as one-third neglecta and two-thirds magna. This exceedingly interesting and important Fort Snelling series was collected by Dr. E. A. Mearns, who writes me concerning the manner of occurrence of Meadowlarks at Fort Snelling as follows: "This locality has two floras, Campestrian along the Minnesota River and Alleghanian (or Transition mixed with Canadian) in the Mississippi Valley. Fort Snelling is at the junction of these rivers, and the small reservation has a correspondingly great variety of plant-life. Driving toward Minneapolis one has the dry plains on the left and the alluvial river-bottom, with Pine Island, etc., on the right. Sturnella neglecta occupies and breeds in the former and Sturnella magna in the latter. I have often heard the totally distinct songs of both species at once when driving along this road."

Madison.—U. S. N. M. No. 127566, May 10; neglecta approaching magna in the pattern of its tail and its coverts.

Wisconsin.


Iowa.


Nebraska.

Ft. Kearney.—Magna, U. S. N. M. No. 13054, June 20; neglecta, B. S. No. 139409, Sept. 9.
Republican Fork.—Magna, U. S. N. M. No. 170735, May 24.
Omaha.—Neglecta, U. S. N. M. No. 88102, March 14, ♂; No. 159366, April 19, ♀; No. 159367, April 19, ♂.
Columbus.—Neglecta, B. S. No. 139402, Aug. 27, juv.
Pole Creek.—Neglecta, U. S. N. M., July 18.
Valentine.—Neglecta, B. S. No. 155878, ♂, April 25.

Kansas.

Belle Plaine.—Magna, B. S. No. 139423, ♂, July 23.
Cairo.—Magna, B. S. No. 139433, ♂, Aug. 1; B. S. No. 139424, July 30.
Trego Co.—Neglecta, W. B. No. 11310, May, 1889; B. S. Nos. 139413, 139404, 139432.

Missouri.

Golden City.—B. S. No. 142087, ♂, July 13, S. magna apparently approaching neglecta, but in too worn plumage to be satisfactorily determined. B. S. No. 139430, July 13, juv. Apparently intermediate; the central tail-feathers abnormally marked with white.

Indian Territory.

18 miles west of Cable.—Magna, U. S. N. M. No. 19102, ♂, May 30.
Ft. Gibson.—Magna, B. S. No. 139429, ♂, June 18.
Hartshorne.—Magna, B. S. No. 139426, ♀, Aug. 29.
Savanna.—Magna, B. S. No. 139427, ♀ juv., Aug. 23.

Texas.

Gainsville.—Magna, Aug. 12, two males, one female; Aug. 8, ♀. March 21, ♂, magna, approaching neglecta in paleness and closely resembling it in the pattern of the tail, tail-coverts, and rump; an evident intermediate.
Henrietta.—*Magna*, B. S., April 13, ♂, typical in all respects except in pattern of the tail, tail-coverts, and rump which are more barred than in average *magna*. B. S., April 11, ♂, *neglecta*, typical.

Concerning the Meadowlarks of Henrietta, Mr. Harry C. Oberholser writes me: "During the summer of 1900 both species (*Sturnella magna* and *S. neglecta*) were found at Henrietta, Texas, in the proportion of about eight or ten of the former to one of the latter. They inhabited often the same ground, apparently fraternizing freely; and both were leading young late in June. The song of each was always easily distinguishable and perfectly characteristic."

Vernon.—*Neglecta*, B. S., April 27, ♂.

Corpus Christi.—A series of thirty specimens from Corpus Christi collected in the spring of 1891 proves of exceptional interest; indeed, I may add, it was the attempt to name these birds which involved me in a study of this genus. Both the *magna* and *neglecta* types of Meadowlark are present in the Corpus Christi region. The former is the breeding bird in the immediate vicinity of the town on the coast, where, in April, I found it to be common and heard many individuals (some of which were collected) sing the characteristic song of *magna*. True *neglecta* apparently does not breed at Corpus Christi but, like certain other western forms,—*Pyrocephalus* for example,—it may possibly be found breeding about fifteen miles west of the town up the Nueces Valley. This, however, is a mere supposition to account for the presence of brown-billed, apparently non-breeding specimens of *neglecta* in April and May, and, more especially, of intermediates.

An analysis of this series presents the following result.

*Magna*, ten specimens, eight males, two females, April 14 to 23. These birds agree very well in color with average eastern specimens of *S. magna*, but it is interesting to observe that, although from further south, they are larger than specimens from the coast of Louisiana. In length of wing they resemble examples from Illinois, the tarsus and bill, however, being somewhat longer.

The exceedingly close resemblance between these birds and two May males in Mr. Sennett’s collection from Xicotencatl, near Tampico, shows, as might be expected, that they are the
northern representatives of *mexicana*, which here appears to be restricted to the humid coast region.

**Neglecta.**—Twelve specimens, including two females, March 19 and 31; two males, six females, April 7 to 16; two specimens (unsexed) May. None of these specimens has the blue bill of a breeding bird and all but one have the throat-patch fringed with ashy. The extent of yellow on the side of the throat is not very clearly defined; in this respect some specimens agree with typical neglecta, others with hoopesi.

**Intermediates.**—The extremes mentioned above under the names *magna* and *neglecta* are connected by a series of intermediates to which, for one reason or another, I would refer eight of the thirty Corpus Christi specimens. They may be described as follows: Am. Mus. No. 67308, ♂, April 1; pattern of back, rump, and tail as in neglecta, color above as in *magna* but more ruddy in tone; yellow confined to throat. Am. Mus. No. 54952, ♀, April 2; pattern of back and rump as in neglecta; tail intermediate in pattern; color above as in *magna* but more ruddy in tone; yellow confined to throat. Am. Mus. No. 54947, ♀, April 14; above intermediate in pattern and color; yellow inclined to extend to the malar region. Am. Mus. No. 54950, ♀, April 14; in pattern, color, and extent of yellow on the malar region fairly intermediate between *magna* and *neglecta*. This bird has the blue bill of a breeding bird and was found associated with *magna*. Am. Mus. No. 67312, ♀, April 16; above, pattern of *neglecta* but intermediate in color; yellow confined to the throat. Am. Mus. No. 67320, ♂, April 23; interscapulars intermediate in pattern; rump and tail with pattern of *neglecta*; color approaching that of *magna*, yellow confined to throat. Am. Mus. No. 67321, ♀, April 23; pattern of back and rump as in neglecta, tail intermediate; yellow confined to throat; color of *magna*. G. B. S. No. 3452, May; intermediate in pattern; color of *magna*; yellow confined to throat.

Opinion would no doubt vary in regard to the exact determination of these specimens, but as a series there can be no doubt that they prove the complete intergradation of *magna* and *neglecta* in southeastern Texas. Whether this intergradation is geographical, that is, correlated with climatic conditions, or whether it is due to the interbreeding of typical examples of
magna with typical examples of neglecta, can only be determined by further field work.

The scarcity of breeding birds and of field observations from our Mexican border is greatly to be deplored, for here it is that the status of hoopesi and its relationships to magna and mexicana are to be determined. However, the specimens at hand are listed as follows:


Rio Grande City.—Neglecta, G. B. S. No. 1470, ♀, April 2; bill brown, yellow extending to malar region; apparently not a breeding bird.

Lomita.—Neglecta, G. B. S. No. 1469, ♀; yellow extending slightly on sides of the throat.

Laredo.—Mexicana, G. B. S. No. 3455, March; G. B. S. No. 3456, ♀, March; G. B. S. No. 3454, ♂, March.

Altuda.—Mexicana, B. S. No. 139389, August 9.

Marfa.—Mexicana, G. B. S. No. 5056, ♂, July 11; G. B. S. No. 5057, ♀, July 11.

The narrow pectoral crescent of these Marfa specimens places them with mexicana rather than with magna but their plumage is too worn to permit of a satisfactory understanding of their relationships with neglecta.

Pecos City.—Mexicana, G. B. S. No. 4832, ♂, June 2; G. B. S. No. 4833, ♀, June 2. Both specimens have the color and narrow pectoral crescent of mexicana but in the pattern of the back, rump, and tail they resemble neglecta; the yellow is confined to the throat.

New Mexico.

San Bernardino Ranch.—Mexicana, U. S. N. M. No. 127492, ♂, Aug. 4; hoopesi, U. S. N. M. No. 127823, ♂, Aug. 3; U. S. N. M. No. 130504, ♂, Aug. 18; U. S. N. M. No. 130503, ♂, Aug. 24. Yellow confined to the throat.

Mexico.

Chihuahua, San Diego.—Mexicana, Am. Mus. No. 56792; no date, worn breeding plumage, bill blue; Am. Mus. No.
56793; worn breeding plumage, bill blue. Four other specimens from this locality, two taken in September and two in February, are referable to hoopesi; or, in other words, are neglecta without yellow on the malar region.

Coahuila, Saltillo.—Neglecta, B. S. No. 144506, ♀ jvr., August 17.
Coahuila, Carneros.—Neglecta, B. S. No. 144507, ♂, August 12.

Sides of throat yellow.

Tamaulipas, Miquihuana.—Neglecta, B. S. No. 158880, ♂, June 7.
Sides of throat yellow.

Tamaulipas, Xicotencatl.—Magna, G. B. S. No. 7384, ♂, May 10; G. B. S. No. 7385, ♂, May 13.

These birds agree exactly with specimens of magna from Corpus Christi.

**Measurements of Males.**

**Atlantic Coast.**

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<th>Tail</th>
<th>Culmen</th>
<th>Collection</th>
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**Cuba.**

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### Mississippi Valley.

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¹ Sturnella magna inexpectata.
Summary.—It appears from this review of the available material from the regions where the ranges of *neglecta* and *magna* come together, that in the Mississippi Valley, between the meridians of 90° and 100°, both *magna* and *neglecta* are typically

---

1 Type of *Sturnella magna alticola.*
2 *Sturnella magna inexpectata.*
3 Type of *Sturnella magna inexpectata.*
represented, that they are sometimes found associated during the breeding season, that their ranges overlap for a distance of several hundred miles, and that intermediates between them, while not proportionately common, do occur, sometimes in connection with typical representatives of both forms.

In southeastern Texas, at Corpus Christi, the fusion of these birds seems to be more complete, though it is not probable that both forms breed there.

On our Mexican boundary, east of the Rocky Mountains, *neglecta*, as a whole, shows an approach to the *magna* type in the absence, usually, of yellow from the sides of the throat. Specimens of *magna* in the lower Rio Grande, and of *mexicana* further west, also occur in this region, and there are also intermediates between the two forms and *neglecta*. Specimens, however, are lacking to show the exact relationships of *mexicana* to *neglecta*, or to its representative *hoopesi*.

**Conclusions.** — Before proceeding further I take pleasure in acknowledging the assistance which Mr. E. W. Nelson has rendered me in explaining certain apparently anomalous cases in the distribution of Meadowlarks in northern Mexico. Mr. Nelson's unequalled field experience in Mexico has given him that knowledge of the topography and climate of the country which is so essential to a proper understanding of the distribution and geographical variation of species, and until he had informed me of the climatic conditions prevailing at certain places, I was at loss to account for the occurrence there of birds included in the collections studied.

As has been previously stated, the material available for examination is not of a nature to permit of wholly satisfactory conclusions being drawn from it. It, however, warrants the presentation of a theory which further research must prove or disprove.

Assuming that Meadowlarks originated in the humid tropics, we have, as the ancestral form, a dark bird which, spreading northward along the coast and over the Mexican tablelands, retained its dark colors in humid regions and acquired a paler color in arid regions. The *neglecta* type originated, therefore, in arid portions of the tableland of Mexico, where its range is bounded on the south by the humid valley of Mexico. On either
side of the tableland it is flanked by a northward extension of the range of *mexicana* along the humid portions of the Sierra Madre, as is shown by the occurrence of dark birds at San Diego in Chihuahua, and perhaps also in the humid mountainous region of western Texas.

Breeding specimens of *neglecta* from the southern parts of the tableland or areas adjoining the Sierras are wanting to show the relationships of the birds in these regions, but it is probable that where an arid region passes into a humid region *neglecta* passes into *mexicana*, as is suggested by the intergradation of specimens at Corpus Christi.

The absence of proper material and of field observations also prevents us from determining whether the specimens of *neglecta* from our southern boundary, which lack yellow on the sides of the throat, and which Mr. Stone has named *hoopesi*, are, as might be supposed, a step in the differentiation of the light bird from the dark one.

The extension of the range of the dark bird northward along the narrow strip of humid coast region is well shown by specimens from near Tampico and from Corpus Christi. A further advance northward has probably been made, as in the case of other specimens still largely restricted to it — *e.g.*, *Quiscalus macrourus* — along the coast region and perhaps up the Mississippi Valley until it has eventually occupied the United States east of the one hundredth meridian.

The extension of the range of the light bird has been northward over the tableland into the western United States, and would appear to have been comparatively rapid, since it is now found occupying humid regions without as yet evincing any decided change in color.

If the assumption of the origin of both birds from a common ancestor be accepted and if their geographical intergradation at the southern limits of the range of *neglecta* be established, we are then in a position to explain their apparent association as species in the more northern parts of their range, on the ground that while their ranges originally diverged like forks of a Y, the ends have finally come together, not as geographical intergrades, but as two forms, both of which have occupied the region where they are found associated at so recent a date that neither shows
the effect of the climatic conditions under which it lives, but exhibits the characters earlier acquired.

In the Mississippi Valley, therefore, we have the apparent anomaly of two geographical races or subspecies of the same species breeding at the same place, and, occasionally associated with them, are certain intermediate specimens showing in varying degrees the characters of both extremes.

Since it is out of the question to suppose that the same environment could produce three phases of the same species at the same place, that is, *neglecta*, *magna*, and intermediates between the two, we can only suppose that such connecting specimens are not geographical intergrades but the results of a union between *neglecta* and *magna*. In fact, loosely speaking, these connecting specimens would be termed hybrids, but, accepting as a definition of this word "the offspring of animals of different species," it is evident that in a strict sense it cannot be applied to these intermediates, which are the progeny of parents not specifically distinct.

While it is greatly to be regretted that the present paper cannot be more conclusive, it is hoped that the theory herein advanced, of the descent from a common ancestor of both *magna* and *neglecta*, of their continued geographic or climatic intergradation on the Mexican tableland, of their independent range extension northward and subsequent meeting and interbreeding in the Mississippi Valley, may at least prove suggestive to students of the genus *Sturnella*.

It remains to acknowledge my indebtedness for the loan of the material on which this paper has been so largely based, and I therefore very gladly express my thanks to Mr. Robert Ridgway, Dr. C. Hart Merriam, Mr. William Brewster, Mr. Witmer Stone, Dr. Louis B. Bishop, and Mr. Outram Bangs for their kindness in sending the specimens included in the appended statement.

*Specimens Examined.*—Collection of United States National Museum, through Robert Ridgway, Curator of Birds, 315; American Museum of Natural History, 240; Biological Survey, through Dr. C. Hart Merriam, Chief of the Survey, 84; George B. Sennett, 37; William Brewster, 25; Philadelphia Academy of Natural Sciences, through Witmer Stone, Conservator of Birds, 21; Outram Bangs, 6; Louis B. Bishop, 6. Total, 734.
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ERRATA.

Page 115, explanation of Fig. 4, for E. scotti read E. caballus.
Page 121, No. 15, for Pipreola auripectus decorus read Pipreola auripectus
decora.
Page 121, No. 35, and p. 183, line 6 from bottom, for Henicorhina anchoreta
read Henicorhina anchoreta.
Page 121, line 12 from bottom, for Myiotherula read Myrmothorula.
Page 138, line 5 from top, before the word BANGS insert Florisuga mellivora.
Page 142, line 3 from bottom, before the word BANGS insert Myiarchus ferox.
Page 173, No. 332, for Cyanerpes cyanea eximea read Cyanerpes cyaneus eximius.
  For additional corrections see pp. 183 and 184.
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Vol. III. Anthropology (not yet completed).


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