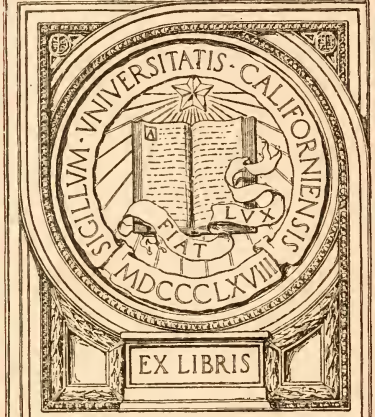
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IV

THE PACIFIC COAST RACES OF THE BEWICK WREN[1]

BY

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INTRODUCTION

The material upon which these observations are based is mainly from the collection of the California Museum of Vertebrate Zoology. Besides the Museum collection proper there are on deposit in that institution the Grinnell, Morcom and Swarth collections. The total aggregation of skins of *Thryomanes bewicki* in that Museum numbers 425 specimens. There was also available material in the Los Angeles Museum of History, Science and Art, including the collections of Messrs. Daggett, Law, Lamb, Richardson, and Willett, in all 109 specimens. To Messrs. Joseph Mailliard and John W. Mailliard the writer is under obligations for the loan of 52 skins, including splendid series of *marinensis,* and series of *drymoecus* and *charienturus* from regions not otherwise represented. From Mr. A. B. Howell 11 skins were borrowed, illustrating special points. Altogether, a total of 597 examples of the Pacific coast forms of *Thryomanes bewicki* were examined in the preparation of this paper. To the institutions

[1]Contribution from the University of California Museum of Vertebrate Zoology.

and individuals above mentioned the writer is under deep obligations for the use of this material.

Next to the data obtained directly from this splendid series of specimens, the writer is inclined to give high place to the informational value of the field work incidental to its collection, in much of which he took an active part. The ideal material upon which to base conclusions as regards relationships and distribution consists of specimens in freshly acquired autumnal plumage, taken at the exact localities where the birds were born. As we have not usually any means of knowing the exact birthplace of a bird, the results of our studies must often depend upon assumptions based largely upon one's knowledge of the species in general and its usual mode of life. Just here is where it would seem that experience and information acquired through extensive field work would be invaluable in aiding in an analysis of the facts presented by series of skins—facts often in apparent conflict. The man who works from the dried skin alone is handicapped more than he usually realizes. In working out the relationships and distribution of closely connected forms, a labor entailing the handling of large series, anomalous specimens are frequently encountered, calculated to lead one astray. Some knowledge of the country and climate, the physical surroundings of the species in general, will frequently give a clue to the explanation, while intimate acquaintance with the bird in life will enable one, to a certain extent, to imagine himself in the bird's place and figure out what, under given conditions, is most apt to occur. The life history and habits of the species in general, the faunal complexion of its usual habitat, the nature and extent of variation in the individual and in the race, are all factors of prime importance, and are all to be learned in the course of field work, some of them in no other way. It is not enough, because a specimen bears a superficial resemblance to a race geographically placed more or less remotely from where it was taken, to place the said specimen with such race. In the writer's opinion, this has been done but too frequently in late years, resulting in extraordinary extensions of ranges of certain subspecies without due justification. Familiarity with the birds in life should serve as a most excellent check to such hasty conclusions.

For many reasons the genus *Thryomanes* as occurring in California is an attractive one to the student of geographical distribution. The birds exist in numbers where conditions are favorable. As the species is not sharply delimited associationally, conditions are more generally favorable than in many other groups of birds, and *Thryomanes* is consequently abundant and widely distributed throughout the state. The variability of the group is notable, birds from different regions exhibiting to a marked degree the types of characteristics which we have learned to look for in animals of the various areas. Thus there are these several factors:—abundance, with consequent accumulation of extensive series of specimens; disregard of associational barriers effective in many other species, with resulting general distribution, this condition permitting careful scrutiny of conditions existing between many stations but slightly separated geographically, though of different faunal aspect; and variability, birds from different regions exhibiting peculiarities of color, etc.—all combining to make this genus a profitable subject for careful examination.

MANNER OF OCCURRENCE

Wrens of the genus *Thryomanes* occur in fair abundance practically throughout the state of California. The genus in this state belongs pre-eminently to the Upper Sonoran zone, but it also occurs commonly in places in Transition, as in the northern coast region, and sometimes in Lower Sonoran, as in parts of the San Diegan region and the San Joaquin Valley. It is not found, however, in the high Transition and Boreal of the Sierra Nevada and the southern Sierras, and it is notably absent from the arid Lower Sonoran of the Colorado and Mohave deserts. This last was unexpected, as the species occurs commonly in regions of similar zonal character elsewhere. The above statements all apply to the *breeding* range of the bird. In seasons other than the nesting time there are exceptions, as noted beyond.

In certain other variable groups, such as the Song Sparrows (*Melospiza melodia*), Horned Larks (*Otocoris alpestris*) and Bush-tits (*Psaltriparus*), associational requirements

are of such a nature as to bar the species from large areas, but *Thryomanes* demands no such rigid conditions for its existence. The essential environmental requisite is underbrush, affording shelter, and this is a condition so universally met with in California that there are few regions that do not answer.

Just one of the California forms of this species has truly migratory habits, *Thryomanes b. eremophilus.* The others are practically resident wherever found. It is true that this fact is not generally recognized, and that there are records of several subspecies from points more or less remote from the breeding ground, but I am convinced that for the most part these records are not well founded. In the extensive series of skins here assembled, and in the field work incidental to the accumulation of the large proportion of them in which the writer took part, there has been no evidence evolved indicating regular migrations of these birds. As evidence to the contrary, the following facts may be adduced: *Thryomanes b. calophonus* is stated to remain in winter at the northern limit of its range (Oberholser, 1898, p. 441), which is also the northern extreme reached by the genus in North America. We do not find *marinensis* or *spilurus* wandering south in winter along the coast of southern California, any more than we do certain other forms of comparable distribution and faunal restriction, such as *Pipilo maculatus falcifer, Zonotrichia leucophrys nuttalli, Junco oreganus pinosus,* etc. In the extensive series of wrens assembled from southern California and from parts of the Mohave and Colorado deserts, numbering some hundreds of skins secured at all seasons of the year, there is none that can be considered as typical of *Thryomanes b. drymoecus,* to be taken as proof of a southward winter movement of this form.

Thryomanes b. eremophilus appears to be truly migratory. Data are lacking to show whether or not the breeding ground is entirely deserted in winter, but the subspecies is known to occupy parts of the Colorado desert during the winter months, while it does not nest in that region. The birds found on the Colorado Desert during winter are apparently migrants from the desert mountains to the northward, and not from eastern Arizona, where this wren is a common resident. Though the Desert Wren has been found in winter to the eastern base

of the mountains separating the desert and coastal regions, there is no known instance of an individual of this subspecies having crossed the divide and invaded the Pacific slope.

While I am convinced of the truth of the statements made above regarding the generally non-migratory habits of the California wrens of the genus *Thryomanes*, excepting *eremophilus*, there do take place certain limited and irregular movements which are not to be considered as migrations. The late summer dispersal of birds in general, the "scatter movement," as it has been called, is common to many parts of the country, and may take individuals, mostly immatures, in any direction. The northward wandering of herons at the close of the breeding season is a well-known instance in point. In parts of California this movement takes the form of an invasion of high mountain regions by many low zone species from the adjacent valleys and foothills (see Grinnell, 1908, p. 22), and *Thryomanes* participates in this to a notable extent. In southern California during July and August, *T. b. charienturus* is one of the most abundant birds in the higher mountains, at altitudes where it never breeds, occurring in numbers to the summits of the highest peaks. As early as the middle of September this invading army has again withdrawn. Several specimens at hand from parts of the Sierra Nevada seem also, from dates and altitudes, to have been wanderers from lower elevations.

This general movement is apt to carry occasional individuals of any of the forms *slightly* beyond the usual faunal confines of their respective races, and there are several instances in the assemblage of skins examined where circumstances seem to indicate a happening of this nature.

The occurrence of *T. b. charienturus* in winter at stations in the western parts of the Mohave and Colorado deserts (as at Barstow, Victorville and Palm Springs), is easily explained as due to continuous favorable avenues of approach from the normal breeding grounds in the foothills of the nearby mountains. Other species properly belonging to the San Diegan faunal region have been similarly found at the same places.

VARIATION

There are but two distinguishable stages of plumage in this species (besides the natal down)—the juvenal and those of the first and subsequent winters. The juvenal differs from the later stages mainly in being mottled or spotted over much of the area that is subsequently uniformly colored. After loss of the juvenal plumage, in the first August and September, there are no further changes in appearance, immatures of the first winter being indistinguishable from adults; after the first year there is but the one molt annually, at the end of the summer. There are thus no seasonal changes in appearance other than those produced by the mechanical wear and tear upon the plumage, amounting to fading of colors proportionate to the nature and extent of exposure, and obliteration of finer markings as the feather tips are worn away. There are no appreciable sexual distinctions of color or markings, merely slight average differences in measurements, males averaging a trifle larger than females.

It is seen that the wrens of this genus have a wide zonal range, and that where a change in life-zones acts as a check, it is, in this group as in most others, usually an absolute barrier to the species rather than an accompaniment of subspecific variation. It is also evident that environmental requirements are not rigid, the species being readily adaptive within rather wide limits. While the species as a whole is wide ranging, however, there is a strong tendency toward separation into different forms or races distinguished by peculiarities of color and proportions. Study of this variation demonstrates close accordance of appearance with locality. In this group of birds each faunal area represented tends to a remarkable degree to produce its own peculiar type. So that it is seen that *Thryomanes*, wide ranging and with the faculty of thriving under varied climate and surroundings, exhibits to an extraordinary extent —perhaps as part of this same adaptability—variation of appearance in accordance with every change in environment.

It must be understood, of course, that the differences alluded to are not always conspicuous. There are frequently variations in proportions requiring careful measuring for detection, or slight differences in color which in scattered speci-

mens might be thought of no especial significance. With a series as extensive and representative as the one here assembled, however, these variations can be recognized as parts of a coördinated whole, and in the occasional instance where an insufficient specimen or two from some obscure locality exhibits an unexpected line of development, there is usually to be found at least a possible explanation of the occurrence.

The extent and manner of variation illustrated in this series of birds can not be too strongly emphasized. For one thing there are enough specimens at hand to show a surprising range in characteristics from any one locality. Many stations are represented each by numerous specimens of freshly molted fall birds, undoubtedly individuals of the resident form of each respective place, as they appear prior to any wear and tear of the plumage. In every case there are individuals exhibiting wide variation in appearance, though extremes may be shown by but one or two specimens. These differences can not be explained save as illustrating the amount of variation to be encountered among individuals at any one point.

These variants are not of the same nature as the "intermediates" encountered near the line of meeting of two different races. In the latter case, as is well illustrated from many such localities in the series here assembled, we find *whole populations* showing characters variously intermediate between two extremes. The occasional variants found elsewhere may crop up at any place, and in appearance do not necessarily incline towards any other subspecific type. It would almost seem as though the species as a whole was in a formative stage, showing occasional response to stimuli which we cannot at present understand.

In this connection it is well to consider conditions in the juvenal plumage. In the several distinguishable Pacific coast forms of *Thryomanes bewicki* the color differences shown in the adults are accurately reflected in the juvenal plumage, young birds of the different recognizable subspecies exhibiting variations of precisely the same nature as are seen in adults, usually in about the same degree. This, according to the general understanding of the significance of characters of the juvenal plumage, would argue great age and consequent deep-seatedness of the color characters observed, which is hard to recon-

cile with the generally variable nature of the several subspecies as observed at this time.

The above statements must not be understood as weighing against the validity of the several "subspecies" so far described from California, for in nearly every case where a name has been applied to a local race it covers an aggregation of characters fairly easily defined and recognized. In fact, the races of *Thryomanes bewicki,* as occurring on the mainland of the Pacific coast, may be taken as an ideal illustration of subspecific division as it is applied in systematic ornithology. There are six recognized forms in this region—*marinensis, spilurus, drymoecus, charienturus* and *eremophilus* in California, and *calophonus* in the coast region to the northward. In every case it is an easy matter to distinguish typical examples of the races. Typical specimens are not necessarily topotypes. The best manifestation of a race may be found at some distance from the type locality; usually at about the center of the geographical area occupied. As departure is made from the habitat of one race toward that of another, in just such proportion is variation encountered among individuals of the races. Geographical continuity of range with corresponding intergradation of characters is usually taken as the test of subspecific, rather than specific, difference, but there are few instances among North American birds where these conditions are as ideally met with as among the Pacific coast forms of *Thryomanes bewicki.*

A brief resumé of the course of variation in some of the most salient features of these races may be profitable. At the extreme northern limit of the species, on the mainland of southern British Columbia and Washington, is *calophonus,* of relatively large size and extremely dark coloration. On the adjacent Vancouver Island is a slightly paler colored, rather more reddish, form (included under the name *calophonus),* of practically the same size. Farther south, on the coast of northern California, southward to the Golden Gate, is *marinensis,* about like Vancouver Island *calophonus* in color but appreciably smaller. South of the Golden Gate is *spilurus,* occupying the narrow coastal strip west of the Coast Ranges, south to about the southern end of Monterey Bay. This form is of a somewhat paler and brighter red than is *marinensis,*

and of slightly greater size. South of *spilurus* is *charienturus* of the coast of southern California, a large sized, pale colored, and long tailed race. There are two inland races of *Thryomanes* in California, *drymoecus* and *eremophilus*. Typical *drymoecus* of the Sacramento Valley is of distinctly reddish coloration, most nearly like, though paler than, *marinensis* and *spilurus*, whose ranges it adjoins in places. *Eremophilus* is a desert race, exhibiting an extreme of pale coloration, and with relatively long tail. Of the insular forms, *nesophilus* of Santa Cruz and Santa Rosa islands, and *catalinæ* of Santa Catalina Island, are but slightly different from the geographically adjacent *charienturus*. They are a trifle darker in coloration, and show certain differences in proportions. *Leucophrys*, of San Clemente Island, is a short tailed race of distinctly pale coloration.

As regards the coastal races, from *calophonus* through *marinensis* and *spilurus* to *charienturus*, the line of variation is continuous, to be traced from one to another without a break. In coloration, from the sooty *calophonus* to the pale *charienturus*, intergradation is perfect. The intermediate stages are represented in *marinensis* and *spilurus*, the dividing lines between these several races being impossible of exact definition. This gradual color change is nicely correlated with the climatic variation of the region, from the extremely humid Puget Sound district, with its somber hued *calophonus*, southward through lessening degrees of humidity accompanied by corresponding brightening of color in the birds. As regards size and proportions, variation is also continuous. *Calophonus* is of large size and with proportionately short tail. Southward, as far as the Golden Gate, as shown by *marinensis* of Humboldt and Marin counties, there is diminution in size. South of this point *spilurus* shows slightly greater dimensions, and, as illustrated by specimens from many intermediate stations, there is steady increase in this regard southward through the range of *charienturus*. Together with increased size southward from the Golden Gate there is correlated a proportionately greater length of tail. In *calophonus*, *marinensis* and *spilurus*, the tail is shorter than the wing. Specimens collected in the region of meeting of *spilurus* with *charienturus* have tail and wing of about equal length, while in typical *charien-*

turus the tail is usually decidedly the longer. *Eremophilus,* of the southern deserts, shows still greater extremes of pallid coloration and length of tail. Between *eremophilus* and *charienturus,* where there is a wide gap in distribution except in one limited region, as noted beyond, there can not be traced the nicely graded series of changes found between the other California mainland forms; judging from the imperfectly representative material here assembled from the southern Sierra Nevada (where apparently the ranges of *eremophilus* and *charienturus* closely adjoin), such a condition may be existent in this region. Further collecting here at the proper seasons is necessary to demonstrate this.

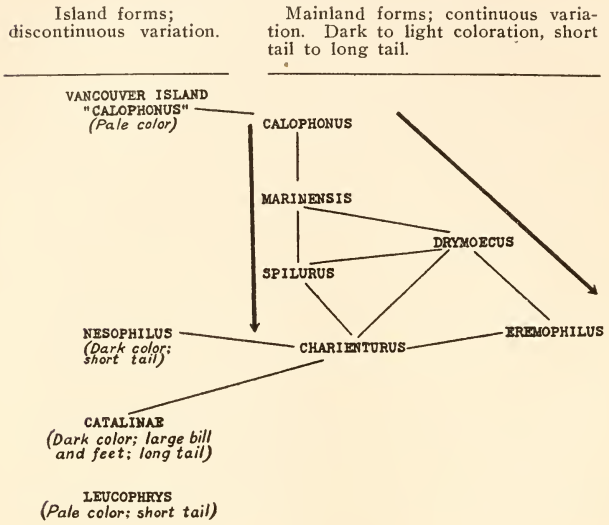
Thus on the whole it is seen that the Pacific coast races of *Thryomanes bewicki* may be divided into two general groups, of pale colored, long tailed forms in the arid southwestern region, and dark colored, short tailed forms in the humid northwestern coast region, with maximums of size at the extreme north and south. In every type of variation, connecting chains of intermediates may be traced, corresponding as exactly in geographical position as in extent of variation. *Drymoecus,* as detailed beyond, occupies a central position, almost surrounded by the other mainland forms, and the characteristics of birds of this subspecies vary exactly as the confines of the several contiguous races are approached.

The insular forms of *Thryomanes bewicki* do not exemplify continuous variation such as seen on the mainland. Vancouver Island *calophonus,* in its comparatively paler browns, shows a departure from the mode that does not accord with the general manner of variation of the species in this region. San Clemente Island *leucophrys,* in its gray coloration, might be regarded as exhibiting results of the same nature as are shown in the comparatively gray *Pipilo maculatus clementæ* of the same island. This theory is upset by the fact that on the closely adjacent Santa Catalina Island (lying directly between San Clemente and the mainland), where *Pipilo m. clementæ* also occurs, the representative form of *Thryomanes, T. b. catalinæ,* is distinguished from the mainland *charienturus* by slightly *darker* brown coloration. *T. b. nesophilus* of Santa Cruz and Santa Rosa islands is again differentiated from *charienturus* by slightly darker, more rufescent, coloration.

In fact, in the insular forms of *Thryomanes bewicki* (as well as in other races of birds occurring upon the several islands of the Santa Barbara group) it is at present impossible to detect generally uniform results of any factor or factors, either as to the occurrence or non-occurrence of species upon the different islands, or in the amount and nature of differentiation that has taken place.

Possible criticism may be invited by the fact that in the present paper certain local races (subspecies) are pointed out and their characteristics described, but no names affixed. This applies particularly to the Vancouver Island form of *calophonus,* and to the wren of the southern boundary of the Great Basin region as distinguished from typical *eremophilus* of the Gila Basin. It is the writer's opinion that the aggregations of individuals occupying these several areas are geographically separated from the typical forms whose names they bear. They are also probably to be distinguished, though with some difficulty, by the average differences indicated; possibly they are local races in early stages of differentiation. The objections to formally affixing names in their cases are two in number: first, in the slightly distinguished races in question it is impossible to indicate more than obscure average distinctions; and second, the extreme variability shown in individuals of even the most strongly marked of the several described forms militates against the recognition of these apparent geographic variants even though they appear to be isolated. The peculiar characters of the Vancouver Island wren are perhaps to be explained as solely a result of isolation. The Desert Wren of southeastern California, in its departure from typical *eremophilus,* shows a distinct approach to *charienturus,* and it may be that in its affinities, as it is geographically, it is intermediate between the two.

DIAGRAM SHOWING INTER-RELATIONSHIPS OF PACIFIC COAST RACES OF *THRYOMANES BEWICKI.*



DETAILED DISCUSSION OF CALIFORNIA RACES

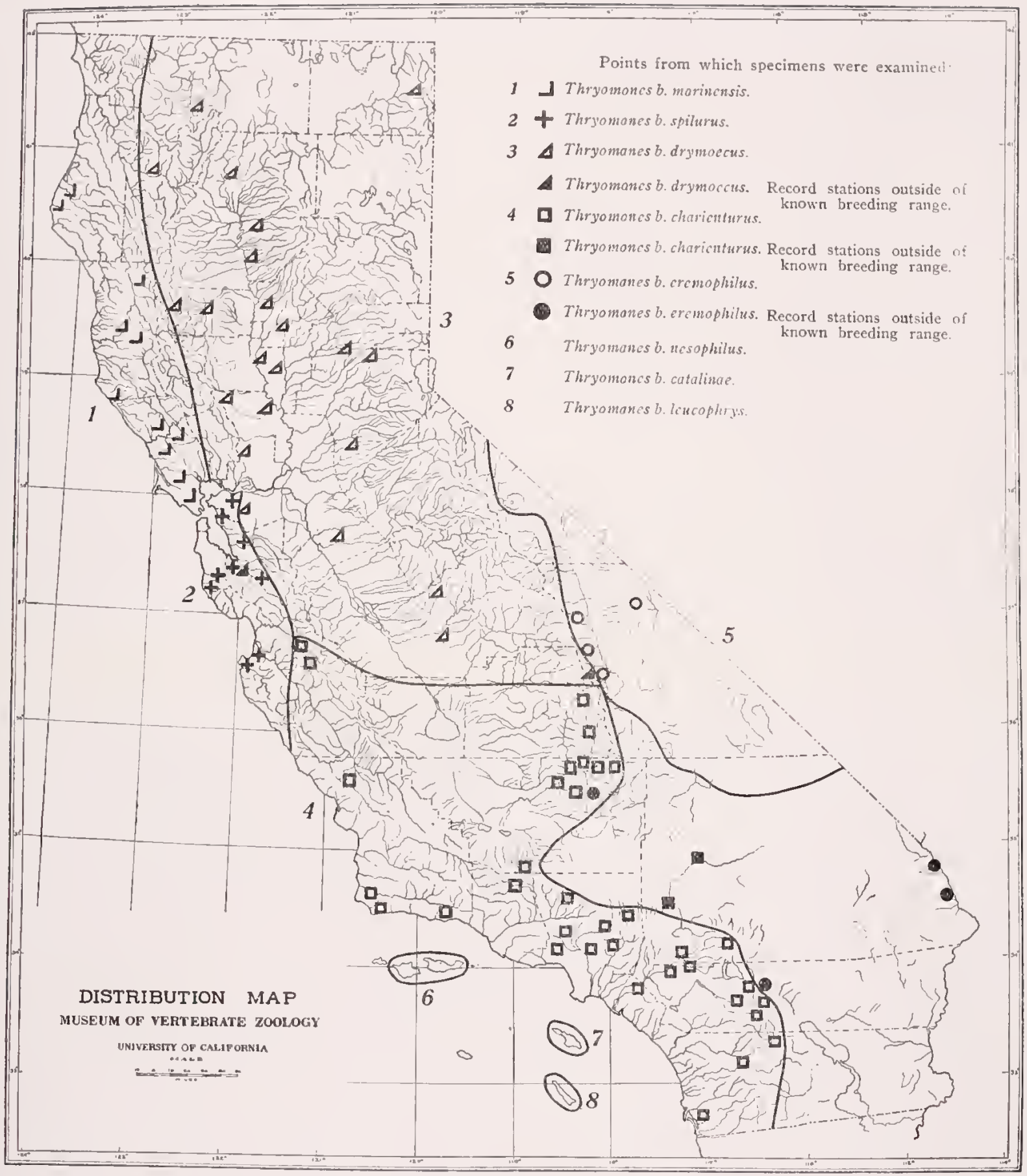
Thryomanes bewicki marinensis Grinnell.

Type locality—Nicasio, Marin County, California.

Range—The humid coast belt north of the Golden Gate, at least to Humboldt Bay; probably to the Oregon line.

Specimens examined from the following localities: Humboldt County: Capetown, 1; Ferndale, 1. Mendocino County: Covelo, 7; Sherwood, 3; Willits, 1; Gualala, 3. Sonoma County: Guerneville, 5; Freestone, 2; Fulton, 1. Marin County: San Geronimo, 14; Nicasio, 3; Inverness, 8. Total, 49.

Distinguishing characters—Similar to *T. b. spilurus,* of the coast region immediately south of San Francisco Bay, but dorsal coloration appreciably darker. Compared with *calophonus* as represented on Vancouver Island, *marinensis* is



Distribution in California of the Subspecies of *Thryomanes bewicki*.

closely similar in coloration; compared with *calophonus* as represented on the coast of Washington and Oregon, it is brighter and less sooty. In size and proportions, intermediate between *calophonus* and *spilurus,* though nearer the latter.

Remarks—The wrens of the northern coast region of California present certain peculiarities of appearance which were commented upon, first by Oberholser (1898, p. 440), and later by Ridgway (1904, p. 565, footnote). The race *marinensis* was formally described by Grinnell (1910, p. 307) upon the basis of these same peculiarities.

There have been available for comparison in the present connection, besides the series of the several California subspecies, 18 skins of *calophonus* from Vancouver Island, and 10 from the mainland of the Puget Sound region of Washington and Oregon. Inspection of these series develops several interesting points in regard to the wrens of the northwestern coast region in general. Judging from the material at hand it seems evident that *calophonus* does not occur in California, unless it is to be found on the coast of the extreme northwestern corner of the state, from which point there are at this time no specimens available. Furthermore, in the range of country at present ascribed to *calophonus,* there appear to be two distinct types existent, lumped under the one name, races which eventually may have to be separated in nomenclature. Specimens from the mainland of Washington and Oregon, which may be considered as typical of *calophonus,* present the extreme of dark coloration in this species. Vancouver Island birds are distinctly paler and more reddish, though of practically the same size. Thus there is the dark colored mainland *calophonus* situated between the Vancouver Island (unnamed) form to the northward, and *marinensis* to the southward, these latter two being paler colored and more reddish, and practically alike in coloration.

To put it a little differently: Beginning at the northern limit of the range of *Thryomanes bewicki* on the Pacific Coast, there is first, on Vancouver Island, a dark, reddish-colored bird of relatively large size. Immediately to the southward, on the mainland of the Puget Sound region, there is an appreciably darker, more sooty form (typical *calophonus*), of

closely similar in coloration; compared with *calophonus* as represented on the coast of Washington and Oregon, it is brighter and less sooty. In size and proportions, intermediate between *calophonus* and *spilurus,* though nearer the latter.

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approximately the same size. South of this, along the northern coast of California southward to the Golden Gate, is *marinensis,* paler colored again, practically the same color as the Vancouver Island bird, but smaller. *Spilurus,* from south of San Francisco Bay, is still paler but a trifle larger, gradually merging, both in color and size, into the larger and more pallid *charienturus* of southern California.

The two birds at hand from the vicinity of Humboldt Bay are typical of *marinensis.* They are like the average of Marin County birds, and are correspondingly unlike *calophonus* of the mainland farther north. In the series from Marin and southern Mendocino counties there are several notably pale colored specimens. A female from San Geronimo (no. 2158, Mailliard coll.) is quite grayish above, and there are several juvenals from southern Mendocino County also aberrantly colored. Such a bird is mentioned by Ridgway (1904, p. 565, footnote), from Nicasio; so altogether, it evidently is not uncommon to encounter such pale colored individuals at this point. This is at once suggestive of exactly similar conditions found prevailing among the bush-tits *(Psaltriparus)* of the region (see Swarth, 1914, pp. 513-515), and it would seem that in both instances the phenomena are to be explained in the same way.

The conditions described as probably explanatory in the case of the bush-tit are as follows: "Marked restriction of territory appropriate to the humid coast races, ineffective barriers interposed against complementary forms of much greater numbers occupying adjacent territory, and continual encroachment of individuals (the radiating overflow) of the latter subspecies" (Swarth, *loc. cit.*). The genus *Thryomanes* appears to offer a parallel instance, though to not so marked an extent as in *Psaltriparus.* Aberrant individuals occur as mentioned above, in a manner similar to that observed in the latter genus, but not so numerously.

A series of juvenals from Marin County is appreciably less bright reddish above than is the case in young birds of *spilurus* from Palo Alto. A series of juvenals from Mendocino County contains several pale colored individuals, more nearly approaching the coloration of *drymoecus.*

Thryomanes bewicki spilurus (Vigors)

Type locality—Near San Francisco or Monterey, California.

Range—Coast region of central California (Santa Cruz faunal district); southern and eastern sides of San Francisco Bay, south to southern end of Monterey Bay. Restricted to the region west of the Coast Range.

Specimens examined from the following localities: Contra Costa County: Martinez, 1. Alameda County: Berkeley, 3; Oakland, 7; Piedmont, 2; Alameda, 1; San Lorenzo, 1; Haywards, 2. San Mateo County: La Honda, 1; Woodside, 2; Pescadero, 2. Santa Clara County: Palo Alto, 24; Milpitas, 1. Monterey County: Pacific Grove, 3; Monterey, 1. Total, 51.

Distinguishing characters—Most nearly like *T. b. marinensis,* whose range adjoins that of *spilurus* at the north, but of lighter brown coloration dorsally, and of slightly greater size. Compared with *drymoecus* it is brighter reddish above. From *charienturus* it differs in deeper red coloration, and in different proportions. In *spilurus* the tail is slightly shorter than the wing; in *charienturus* the tail is longer than the wing.

Remarks—Thryomanes bewicki spilurus, as here restricted, ranges over a limited area in the central coast region of California between San Francisco and Monterey bays. Geographically it occupies a position between *marinensis* and *charienturus,* and analysis of the characters of *spilurus* demonstrates that in this latter respect also it is a transitional step between the races to the northward and to the southward. Palo Alto specimens present the best manifestation of the characters of *spilurus* of any of the series at hand. These birds are quite uniformly bright reddish above, the only exceptions being two or three individuals, rather duller colored, and apparently verging toward *drymoecus.*

Birds from the east shore of San Francisco Bay (Berkeley, Oakland, etc.) present a certain peculiarity of coloration, for with hardly an exception they are extremely dark and sooty in appearance, as remarked by Oberholser (1898, p. 439). This is undoubtedly partly, but not altogether, due to smoke stain, the darkening effect of which has been noted in certain

other species at these points. I am inclined to class the birds of this region as representing an intergradient stage between typical *spilurus* of the coast region and *drymoecus* of the interior. The plumage, normally of a less bright rufescence than in the former, is still further modified by the action of the smoke, producing the extremely dark effects seen in the specimens at hand. Of the available skins from the east side of San Francisco Bay, practically all were secured at suburban points in the various towns, where they would be subject to the effects of the smoke of the communities. There is one specimen in the series that forms a striking exception to the above remarks. This is no. 4284, coll. Mus. Vert. Zool., collected by Dr. J. G. Cooper, at Martinez, Contra Costa County, December 15, 1863. This bird is bright, clear reddish above, closely similar to certain of the Palo Alto specimens, and even brighter colored than many from that point. It shows no sign of smoke stain. This latter fact may possibly be due to the fact of there being less smoke in the atmosphere in this general region at that early date.

There are in the series four specimens from the vicinity of Monterey Bay, three from Pacific Grove and one from Monterey. This is too small a series to draw conclusions from, but one of these birds (coll. J. & J. W. Mailliard, no. 4691) displays what appears to be a distinct trend toward the coloration of *charienturus*.

Thryomanes bewicki drymoecus Oberholser

Type locality—Baird, Shasta County, California.

Range—The central portion of California; the Sacramento Valley, and northward at least to the Oregon boundary; northeast to the Warner Mountains, on the Nevada boundary; the west slope of the central Sierra Nevada, everywhere below Transition; southward over about the northern half of the San Joaquin Valley. Specimens from the east slope of the Sierra Nevada at Carroll Creek, taken in September, may have been wanderers from the west side of the mountains, and not necessarily within the normal breeding range.

Specimens examined from the following localities: Modoc County: Cedarville, 2; Sugar Hill, 1. Trinity County: Hel-

ena, 1. Siskiyou County: Callahan, 2. Shasta County: Baird, 1. Tehama County: Tehama, 5; Tuscan Springs, 1. Glenn County: Winslow, 1. Colusa County: Stony Ford, 2. Butte County: Chico, 3; Oroville, 2. Sutter County: West Butte, 2; Sutter, 5. Yolo County: Grand Island, 1; Rumsey, 3. Solano County: Vacaville, 11. Amador County: Carbondale, 2. Nevada County: Cherokee, 4; Montezuma Hill, 2. Placer County: Blue Canyon, 1. Inyo County: Carroll Creek (east slope of the Sierras), 4. Fresno County: Lane Bridge, 1. Madera County: Raymond, 2. Stanislaus County: Modesto, 7. Mendocino County: Mount Sanhedrin, 1. Contra Costa County: Walnut Creek, 8; Mount Diablo, 6. Santa Clara County: Palo Alto, 1. Total number of specimens, 82.

Distinguishing characters—Compared with *charienturus, drymoecus* has the upper surface darker and more rufescent. The tail is somewhat shorter, and in different proportion to the wing. In *charienturus* the tail is slightly longer than the wing, in *drymoecus* slightly shorter. Compared with *spilurus,* the upper surface of *drymoecus* is a duller and less rich brown. In the juvenal plumage the character of intensity of rufescence of the upper surface is also apparent, young of *drymoecus* being less deeply colored than young of *spilurus* and *marinensis* on the one hand, and somewhat darker (though slightly so) than the young of *charienturus* on the other. It is noteworthy in this regard that whereas in typical *drymoecus* (Sacramento Valley birds) the adults approach *spilurus* more nearly than they do *charienturus,* the juvenal plumage is but slightly different from the same stage in *charienturus.*

Remarks—Of the available material of this form, the greater part consists of summer adults in rather worn plumage, with a good proportion of juvenals. There is a lack of birds in fresh fall plumage.

Thryomanes bewicki drymoecus is a composite race, and one probably not subject to exact definition. It differs from all the other California forms of *Thryomanes* in the nature of its geographical position, being centrally placed and apparently intergrading with each of the surrounding races at the various points of contact. Consequently birds from different re-

gions exhibit a diversity of appearance that renders it difficult in the extreme to frame a satisfactory characterization of the race, and in places the dividing lines must be somewhat arbitrarily drawn.

Birds from the Sacramento Valley exhibit the best manifestation of the characters of the subspecies. These characters consist of decidedly reddish dorsal surface (though not so rich a red as in *marinensis* and *spilurus*) and short tail, bearing a different relation to length of wing than is seen in *charienturus* and *eremophilus*. Thus in the last analysis the form *drymoecus* is seen to be an intergradient between the long-tailed, pale colored, southern and desert races, *charienturus* and *eremophilus*, and the short-tailed, richly colored, coastal subspecies, *marinensis* and *spilurus*. This is so markedly the case that while in the Sacramento Valley *drymoecus* may be considered a fairly well marked form, just as this center is departed from so is there encountered a variation of characters tending toward whichever of the other subspecies is approached.

There is at hand one adult from Baird, Shasta County, California, the type locality of *T. b. drymoecus*. There are also available one from Trinity County and two from Siskiyou County, all in the same general region in north central California. As indicated by this small series the birds from this part of the state seem to belong to the subspecies *drymoecus*.

Warner Mountain District. There are one adult and two in juvenal plumage from the Warner Mountains, in the extreme northeastern corner of California. The old bird is decidedly gray, as compared with Sacramento Valley specimens, but the two young ones are even more rufescent than are comparable examples from the latter locality. The dull color of the adult is so noticeable as to suggest the possibility of the existence of a definable local race in this little known portion of the country, but in view of the manner of variation shown by *drymoecus* in others of the outlying parts of its range, I prefer at present to regard this specimen as another example of the variability of the form. In this connection it may be well to call attention to the possibility that the wren recorded from Camp Harney, southeastern Oregon, by Bendire (1877,

p. 113), and tentatively referred to *eremophilus* by Oberholser (1898, p. 429), may well be of the same race as the Warner Mountain bird.

Sacramento Valley. Thirty-eight specimens from the following counties: Tehama, Glenn, Butte, Colusa, Sutter, Yolo, Solano, and Amador. Of this series 25 are adults, the remainder in juvenal plumage. They were collected during spring and summer, from early March until the middle of July, hence the adults are all in rather worn plumage. Despite this wear, however, these specimens uniformly exhibit to a marked extent the characteristic reddish dorsal surface of the subspecies. As indicated above Sacramento Valley birds may be regarded as typically representative of the interior form, *drymoecus*.

San Joaquin Valley. Birds from this valley are not so easily or satisfactorily disposed of. Both Oberholser (1898, p. 437) and Ridgway (1904, p. 563) have included this region in the habitat of *drymoecus,* but the former author at least had no examples from this valley, as shown by his list of the localities from which specimens were examined. The region is not satisfactorily represented in the series now available, but there is at hand a series of seven skins from Modesto, Stanislaus County (Mailliard coll., nos. 6987, 6993, 7125, 7333, 7385, 7386, 7400), two specimens from Raymond, Madera County (Mus. Vert. Zool., nos. 19,688, 19,689), and one from Lane Bridge, near Fresno (Mus. Vert. Zool., no. 19,687). All of these points are in the east central portion of the San Joaquin Valley. Of these the Modesto birds were collected in January, February, March, and May, the Lane Bridge and Raymond examples in April. Some of them are breeding birds, and the probabilities are that the January and February specimens are also examples of a resident form. At any rate peculiarities of appearance can hardly be explained on the ground that the birds are wandering examples of *charienturus,* for this more southern form would hardly be found represented by individuals wintering so far north of their summer home. On the other hand, these San Joaquin Valley birds are too unlike Sacramento Valley *drymoecus* to be regarded as southward traveling visitants from that region.

So, on the whole, the series may safely be considered as representing the form breeding in this same general region. In coloration the whole series is quite uniform and but slightly distinguished from *charienturus,* being more nearly like this race than like Sacramento Valley *drymoecus.* In measurements the birds stand about midway between the two forms, though rather nearer the latter (see table). All things considered, I have regarded these birds as illustrating intergradation between typical *drymoccus* and *charienturus,* and as representing about the extreme southern valley locality which the name *drymoecus* may be used to cover.

Sierra Nevada. There are six spring birds from Nevada County. Two are from Montezuma Hill, taken March 30, and four from Cherokee, April 5 and 7. From these dates they may fairly be assumed to be representative of the breeding bird of the region. In coloration they closely approach Sacramento Valley *drymoecus,* though they are not quite so reddish; in measurements and proportions there is no difference.

There are at hand four immatures in fresh winter plumage: a male, Blue Canyon, Placer County, October 21; two males and a female, Carroll Creek, east slope of Sierra Nevada in Inyo County, September 11 and 12; all collected at altitudes from 5000 to 7500 feet. A difficulty arises in the proper weighing of the characters of these birds, in that they were evidently late summer wanderers from lower altitudes, from just where, it is impossible to say.

The Blue Canyon specimen (Mus. Vert. Zool., no. 23,295) is dark reddish above, widely different from autumnal *charienturus,* but not so readily distinguished from fall specimens of *marinensis.* It is presumably typical of the fall plumage of *drymoecus* as occurring in the central Sierra Nevada. The three birds from Carroll Creek (Mus. Vert. Zool., nos. 20,858, 20,859, 20,866) are quite different in appearance. They are but slightly reddish above, and with a grayish cast not seen either in *charienturus* or in typical *drymoecus.* As to the precise region occupied by these latter birds during the breeding season, that, of course, is problematical, for they might have wandered even from over the crest of the Sierras; but their appearance leads to the assumption that they represent an ex-

treme southern outpost of Sierran *drymoecus,* where that race abuts on *eremophilus.* The grayish cast of the dorsal surface may well be explained as evidence of intergradation between the two.

From Walnut Creek and Mount Diablo, Contra Costa County, there is a series of two adults and 12 juvenals. The adults, June birds in excessively worn plumage, bear no resemblance to the ruddy colored *spilurus* of the nearby coast region. The young birds, too, lack the clear reddish tone of Palo Alto juvenals, and are very similar to young birds from the Sacramento Valley. The series is unsatisfactory in the lack of fresh plumaged adults, but is apparently to be referred to *drymoecus,* though tending toward the coast form *spilurus.* Birds from the east shore of San Francisco Bay (Berkeley, Oakland, etc.), the nearest point in the range of *spilurus,* are themselves for the most part not typical of that race, so that specimens from this whole general region may be regarded as illustrating intergradation between the coastal *spilurus* and *drymoecus* of the interior. The reference of the Walnut Creek and Mount Diablo birds to *drymoecus* is necessarily based almost wholly upon the appearance of the juvenals. Fortunately there are certain characteristics at this stage, as shown by the large series from the Sacramento Valley, apparently justifying such procedure.

There is one specimen at hand from a point outside of the general breeding range of *drymoecus,* which I feel obliged to refer to this form. This is an immature female (no. 5268, Grinnell coll.) taken at Palo Alto, California, September 27, 1902, and in complete first winter plumage. In color and proportions this bird appears to be unequivocally *drymoecus.* Without conceding any regular migratory habits to the form, it is quite possible for occasional individuals to stray during late summer and fall for as short a distance as is indicated by this capture. I believe this specimen to be such a wanderer from the breeding ground.

The subspecies *Thryomanes bewicki drymoecus* has been denied recognition by the American Ornithologists' Union Committee, and declared to be "not separable from *Thryomanes b. spilurus*" (1901, p. 314). At a later date, in the third edition of the *Check-List* (1910, p. 339), the ascribed range

of *drymoecus* is included in that of *T. b. charienturus.* Conceding that *drymoecus* is not as sharply defined a race as certain other forms of the species, still the disposition accorded it under this latter ruling is certainly unsatisfactory, and not tending to assist to an understanding of existing conditions. The wren of the Sacramento Valley is as widely different from *charienturus* of southern California as is the northern coast bird, to which it is more nearly related. If it is not deemed desirable to recognize these slightly differentiated forms in the *Check-List,* a better compromise would be effected by extending the range of *spilurus* to include the Sacramento Valley and central Sierra Nevada, that of *charienturus* to extend through the San Joaquin Valley. Such treatment would be nearer the truth than is the present accepted arrangement; but even so, there would be encountered the difficulties and discrepancies bound to arise in the attempt to define by rigid lines the many fluctuations encountered in the birds of these wide and varied regions.

Thryomanes bewicki charienturus Oberholser

Type locality—Nashoguero Valley, Lower California (near Mexican and United States boundary line).

Range—Coast region of southern California, south from San Benito County and into northwestern Lower California. Breeds mainly on the coastal slope, but in winter is found eastward to the western edges of the Colorado and Mohave deserts, as at Palm Springs, Victorville and Barstow.

Specimens examined from the following localities: San Benito County: Paicines, 13; Mulberry, 4. San Luis Obispo County: Paso Robles, 1. Santa Barbara County: Santa Barbara, 2; Lompoc, 4; Point Conception, 1; Santa Inez River, 1. Ventura County: Mount Pinos, 1; head of Piru Creek, 1. Tulare County: Cannell Meadow, 1; Monache Meadow, 1; Trout Creek, 7. Kern County: Weldon, 3; Onyx, 3; Isabella, 2; Bodfish, 2; Walker Pass, 3; Piute Mountains, 4. Los Angeles County: Pasadena, 91; San Fernando Valley, 19; Santa Monica Mountains, 3; Sierra Madre, 3; Monrovia, 1; San Gabriel Mountains, 6; San Francisquito

Canyon, 2; Los Angeles, 7; El Monte, 2. San Bernardino County: San Bernardino Mountains, 5; Cajon Wash, 1; Victorville, 5; Barstow, 1; Reche Canyon, 3. Riverside County: Riverside, 5; San Jacinto Mountains, 28; Vallevista, 4; Palm Springs, 6; San Gorgonio Pass, 1. Orange County: Santa Ana Canyon, 1. San Diego County: San Diego, 1; Witch Creek, 1; Cuyamaca Mountains, 2. Total, 252.

Distinguishing characters—Coloration paler, less rufescent dorsally than in any other form of *Thryomanes* from the mainland of California, save *cremophilus.* In fresh fall plumage adults of *charienturus* average close to Saccardo's umber, a color about intermediate between the richer, more rufous, raw umber of *spilurus,* and the grayer hair brown of *cremophilus.* In measurements *charienturus* differs from *cremophilus* in smaller size; from *spilurus, marinensis* and *drymoecus* in different proportions, usually having tail longer than wing, whereas in the latter three forms the reverse is the case.

Remarks—It is in the relative geographical positions accorded to *charienturus* and *drymoecus* that the results of my observations are most at variance with those of the writers who have previously studied the group. Both Oberholser (1898, p. 437) and Ridgway (1904, p. 563) define the habitat of *drymoecus* as inclusive of the entire San Joaquin Valley, and as extending westward to the coast in San Luis Obispo County. As already stated under *drymoecus,* birds from the central San Joaquin Valley are not typical of that form, being rather of the nature of intergrades toward *charienturus.* Still less are birds from the coast region of San Luis Obispo and Santa Barbara counties to be regarded as representative of *drymoecus.* Such divergence from the mode of *charienturus* as they exhibit appears to be an approach toward *spilurus,* whose territory they border. This, to my mind, is a satisfactory explanation of the slightly more reddish coloration of certain individuals, as well as of the variation in measurements.

Seventeen skins from San Benito County, 13 from Paicines and four from Mulberry, most of them in fresh, unworn plumage, afford excellent comparative material from an intermediate locality, about at the meeting place of the ranges of

charienturus, spilurus and *drymoecus.* These birds in coloration are practically like southern California *charienturus,* being no more rufescent than are most specimens from that region, and less reddish than birds from the coast of Santa Barbara County. In measurements the San Benito County birds are shorter tailed than is typical *charienturus,* and thus approach *spilurus* or else San Joaquin Valley *drymoecus.* There is very little difference in measurements between these latter two.

There is at hand one skin from San Luis Obispo County and eight from the coast of Santa Barbara County. Some, but not all, of these birds are slightly darker and more rufescent above than *charienturus* from points farther south, but I believe that all are to be referred to that form. It is probably the type of specimen such as I have at hand from San Benito and Santa Barbara counties that formed the basis for the extension of the range of *drymoecus* to these points, but I prefer to regard such birds as illustrating intergradation between *charienturus* and *spilurus,* over the intermediate territory which they occupy. They are with difficulty distinguished from typical *charienturus,* and are certainly quite different in appearance from typical *drymoecus* of the Sacramento Valley.

The excellent series of skins at hand from the coastal region of Los Angeles, San Bernardino and Riverside counties, includes specimens in all stages and from all seasons, and, judging from these, it would seem that the race *charienturus,* as confined to southern California, is as well defined as any of the forms of the genus *Thryomanes.* Here, too, however, there is a certain amount of variation, usually in shade of rufescence dorsally, even in specimens in fresh fall plumage taken at practically the same points; differences that can hardly be explained on any grounds save that they represent the variability existing among individuals of the one race. Segregation according to age or sex yields no uniform or satisfactory divisions.

In the series at hand there are six winter birds from points at the western edge of the Mohave Desert, five from Victorville and one from Barstow. These specimens have been recorded as *drymoecus* (Mailliard and Grinnell, 1905, p. 101; Grinnell, 1901, p. 70), but I am unable to distinguish them

from Pacific Slope *charienturus,* and believe that they are probably wanderers from the nearby San Bernardino Mountains. Midwinter specimens from Palm Springs, at the western edge of the Colorado Desert, belong in a similar class, of winter visitants from the adjacent San Jacinto Mountains.

There is available a series of 23 skins from the southern Sierra Nevada, in Tulare and Kern counties. Of these, 14 are juvenals, while the nine adults are in midsummer plumage, so frayed and faded as to be of little value for color comparisons. It is evident, however, that this series is not to be referred to *drymoecus,* and at present it seems best to include it under *charienturus.* The young birds are decidedly less reddish than juvenals of *drymoecus,* averaging closely similar to young *charienturus.* The variability shown among them tends toward grayish extremes, certain individuals being even paler colored than the average of *eremophilus.* The adults closely approach *charienturus* in similarly worn plumage, and in measurements and proportions also approximate this form.

There are at hand, fortunately, three adults in fresh, unworn plumage, taken in December in the Piute Mountains, at the southern extremity of the Sierra Nevada. These birds are unequivocally *charienturus,* and I believe it is fair to assume that they represent the resident form of this region. Altogether the available material is sufficient to justify the statement that the wren of the extreme southern Sierra Nevada is not *drymoecus.* At first it seemed questionable as to whether or not the birds were representative of *eremophilus,* which breeds on the east slope of the Sierras a short distance to the northward. The juvenals, as noted above, tend toward an extreme of grayish coloration, while the faded adults have something of the appearance of the Desert Wren. Also the presence in the series of an undoubted example of *eremophilus* from the Piute Mountains in September tended to obscure the facts, but this bird in all probability was a migrant from the desert regions to the eastward.

Fresh plumaged *Thryomanes* from the Sierra Nevada of Kern and southern Tulare counties are desirable, and it may be that such will exhibit characteristics intermediate between typical *charienturus* and *eremophilus.*

Thryomanes bewicki nesophilus Oberholser

Type locality—Santa Cruz Island, California.

Range—Santa Cruz and Santa Rosa islands, California.

Specimens examined from the following locality: Santa Cruz Island, 19 (14 adults, 5 juvenals).

Distinguishing characters—Most nearly like *T. b. charienturus* of the adjacent mainland, from which it is but slightly differentiated. In coloration the dorsal surface and flanks are of a somewhat darker brown than is the mode in the mainland form. Tail usually shorter than wing; in just one of the adults at hand is it the reverse. In *charienturus* the tail is generally longer than the wing.

Remarks—The Santa Cruz Wren is apparently one of the most illy defined of any of the described forms of *Thryomanes bewicki.* The available series affords satisfactory material for comparison, containing four September specimens in newly acquired winter plumage, others taken in early spring, before becoming excessively worn, and some juvenals. Judging from these specimens this island form has become but slightly differentiated from the mainland race. I am able to appreciate the average slightly darker coloration of upper surface and flanks, but it is covered in the range of variation shown by mainland *charienturus,* occasional individuals of the latter being quite as dark.

The difference in proportions is perhaps the most tangible character, for the proportionately shorter tail of *nesophilus* is evident upon measurement. It is perhaps noteworthy that the slight differences serving to distinguish *nesophilus* from *charienturus* are steps in the direction of *spilurus,* the slightly more reddish dorsal coloration, darker flanks, and shorter tail, being just the characteristics encountered in birds occupying the intermediate coastal region between the ranges of *charienturus* and *spilurus.* The mainland nearest to Santa Cruz Island forms part of this intermediate region.

Thryomanes bewicki catalinæ Grinnell

Type locality—Avalon, Santa Catalina Island, California.

Range—Santa Catalina Island, California.

Specimens examined from the following locality: Santa Catalina Island, 14.

Distinguishing characters—Closely similar to the mainland form *charienturus,* but averaging slightly darker dorsally, and with somewhat heavier bill and feet.

Remarks—The peculiarities of the Santa Catalina Island Wren had been already commented upon (Oberholser, 1898, p. 436) before Grinnell (1910, p. 308) affixed a name to the race. The differences distinguishing this form from *charienturus* of the neighboring mainland, however, are but slight, barely sufficient to indicate average distinctions in series from the two regions. Of the skins at hand, 13 are adults, mostly in winter plumage, fresh and unworn. These show the color difference claimed for the race, as well as differences of proportions, and, admitting that these differential characters are not trenchant, still they exist, and their existence justifies the use of a separate name, especially in an insular form.

Thryomanes bewicki leucophrys (Anthony)

Type locality—San Clemente Island, California.

Range—San Clemente Island, California.

Specimens examined from the following locality: San Clemente Island, 23.

Distinguishing characters—In coloration *leucophrys* is noticeably grayish as compared with the darker colored neighboring races, *catalinæ, nesophilus* and *charienturus.* In its pale color *leucophrys* thus approaches *eremophilus,* but is easily distinguishable by size and proportions; *leucophrys* has shorter wings and tail, and longer bill. It also has tail shorter than wing, while in *eremophilus* the reverse is true. The broader superciliary stripe of *leucophrys* is diagnostic.

Remarks—The San Clemente Wren is a strongly marked form presenting various points of difference easily appreciated by the most casual observer. The generally pale coloration is apparent in the juvenal as in the adult plumage, and the broader and more conspicuous superciliary stripe is also a feature in the juvenal plumage.

The series available contains 10 adults and 13 juvenals. The adults are all spring and summer birds, more or less worn and faded, there being no fresh autumnal specimens in the lot. Fall birds are probably more rufescent.

Thryomanes bewicki eremophilus Oberholser

Type locality—Big Hatchet Mountains, Grant County, New Mexico.

Range in California—The part of California known to be occupied by this form during the breeding season is limited to the higher mountains of the desert regions of the eastern part of the state in Inyo and Mono counties, and on the east slope of the Sierra Nevada from Lone Pine Creek an undetermined distance northward. In winter it occurs over the breadth of the Mohave and Colorado deserts, westward to the Piute Mountains and to Palm Springs.

Specimens examined from the following localities: California. Inyo County: Inyo Mountains, 2; Kearsarge Pass, 1; Lone Pine Creek, 1; Little Cottonwood Creek, 1. Kern County: Piute Mountains, 1. Riverside County: Palm Springs, 1. Colorado River between Needles and Riverside Mountain, 9. Arizona: Fort Mohave, 3; Huachuca Mountains, 33; Chiricahua Mountains, 6; Fort Lowell, 13; Santa Cruz River near Tucson, 1. Total, 72.

Distinguishing characters—Largest of the California forms of *Thryomanes* (see table). Tail longer than wing. Coloration pallid, the palest colored of the California subspecies of the genus.

Remarks—The series here accumulated from different points in southeastern California presents certain peculiarities of appearance that suggest the possibility of these birds representing a form recognizably distinct from typical *eremophilus*. In general the California birds appear to be slightly darker dorsally and on the flanks, and slightly smaller, with proportionately shorter tail. Also in the California birds the ground color of the black-barred central rectrices is usually brownish, where in specimens from Arizona it is more decidedly gray; in the California birds there is a tendency toward a dusky, un-

MEASUREMENTS IN MILLIMETERS (AVERAGE, MINIMUM AND MAXIMUM) OF PACIFIC COAST RACES OF *THRYOMANES BEWICKI*

	WING	TAIL	CULMEN	TARSUS	Middle Toe without Claw
Thryomanes b. calophonus					
7 males, Vancouver Island, British Columbia	53.0 (51.5–54.2)	51.0 (47.0–54.0)	14.8 (14.0–15.5)	19.3 (18.0–20.0)	13.0 (13.0–14.0)
9 males, coast of Washington and Oregon	52.1 (50.0–55.0)	52.0 (49.0–55.5)	14.8 (14.0–15.5)	19.1 (18.5–20.0)	13.3 (12.5–14.0)
Thryomanes b. marinensis					
10 males, Humboldt and Marin counties, California.	50.5 (48.5–52.0)	49.0 (46.5–51.0)	14.1 (13.0–15.5)	19.0 (18.0–20.0)	12.1 (11.0–13.2)
Thryomanes b. spilurus					
10 males, San Francisco Bay and Monterey Bay, Cal.	51.9 (50.5–53.5)	50.9 (50.0–52.2)	14.3 (13.5–15.0)	18.5 (17.2–19.5)	11.7 (11.0–13.0)
Thryomanes b. charienturus					
10 males, Riverside and Los Angeles counties, Cal.	52.4 (50.5–55.5)	53.6 (50.2–56.0)	14.9 (14.0–15.5)	18.7 (18.0–19.5)	11.7 (10.5–12.0)
Thryomanes b. drymoecus					
10 males, Sacramento Valley, California	51.6 (50.0–53.5)	49.3 (47.5–54.0)	14.4 (13.5–15.2)	18.4 (18.0–19.2)	12.1 (11.5–13.0)
7 adults (6 males, 1 female), central Sierra Nevada, California	51.2 (50.0–54.0)	49.7 (47.5–53.0)	14.3 (14.0–15.0)	18.3 (18.0–18.8)	12.2 (12.0–12.5)
7 males, San Joaquin Valley, California	53.1 (50.2–55.0)	51.4 (48.0–53.5)	14.4 (13.5–15.5)	18.7 (18.0–19.2)	12.3 (11.5–13.0)
Thryomanes b. eremophilus					
10 males, southeastern California	55.2 (54.0–58.0)	56.9 (52.0–61.0)	13.6 (12.0–15.0)	18.1 (17.0–19.2)	11.5 (11.0–12.0)
10 males, Huachuca Mountains, Arizona	57.1 (56.0–59.0)	57.7 (53.5–60.5)	13.9 (13.2–15.0)	18.1 (17.0–19.0)	12.0 (11.0–12.5)
Thryomanes b. catalinae					
7 males, Santa Catalina Island, California	53.2 (52.0–55.0)	54.2 (52.0–56.5)	15.2 (14.5–16.0)	19.5 (18.0–20.0)	12.8 (12.0–13.5)
Thryomanes b. nesophilus					
10 males, Santa Cruz Island, California	52.8 (51.0–55.5)	51.7 (48.0–56.0)	14.7 (14.0–15.2)	19.1 (18.2–19.8)	11.9 (11.0–13.0)
Thryomanes b. leucophrys					
8 males, San Clemente Island, California	52.1 (50.0–53.8)	49.4 (46.5–52.5)	14.7 (14.0–15.5)	19.2 (18.5–20.0)	12.3 (12.0–13.0)

barred area at the tip, as shown in a considerable proportion of specimens.

In southeastern Arizona *eremophilus* is a common resident of both the Upper and Lower Sonoran zones, being abundant in the Lower Sonoran river valleys. In eastern California this wren appears to breed only in Upper Sonoran, migrating down into Lower Sonoran in the winter months. It is, I believe, the only California wren of this genus that has truly migratory habits.

That individuals of the species should be found in the valley of the Colorado River, at the western boundary of Arizona, in winter only (Grinnell, 1914, p. 209), while the species is resident the year through in valleys of similar zonal character in the eastern part of the state, argues, it seems to me, that these sets of individuals represent two entirely separate aggregations, two distinct subspecies, if we wish to call them so. Furthermore, observations so far made as regards other species show that the valley of the Colorado does not serve as a winter home for birds from the colder country to the eastward. The transient winter population of this valley seems to come almost entirely from the Great Basin region to the northward, with its surrounding mountains, and it is fair to assume that these winter visiting wrens are also from that region. The slight differential characters apparent, as enumerated above, appear to bear out this assumption.

Personally I believe that there are at least two separate forms included under the term *eremophilus* as now used, one occurring in the Great Basin region of southern Nevada and eastern California, migrating over the Colorado and Mohave deserts in winter, the other represented by the resident bird of southeastern Arizona. Additional material is needed from California, in the nature of fresh autumnal and early spring specimens from breeding stations, more clearly to demonstrate the presence of differentiating characters. In the absence of such material, and bearing in mind the variability shown by the wrens of this genus where different subspecies meet, it seems advisable to refrain from formally affixing a name to the possibly recognizable California race. It is significant in this connection to note that in proportion as California specimens of

eremophilus differ from the mode of that subspecies, so do they approach *charienturus* or *drymoecus*.

There is a specimen of the Desert Wren at hand collected in the Piute Mountains, Kern County, September 6, 1903. As noted previously in this paper, under *charienturus,* examples of the latter race were taken in winter in the same mountain range; and circumstances make it appear that *charienturus* is the resident form. With little doubt *eremophilus* is but a migrant or winter visitant at this point. There is at hand another example of this subspecies from Palm Springs, Riverside County, taken December 30, 1903. The Desert Wren thus ranges in winter over the breadth of the Colorado Desert, and probably over the Mohave Desert as well, but it evidently is rare at the western borders of these tracts. Considerable winter collecting at points on the Mohave River, as at Victorville and Yermo, has failed to disclose its presence there, and the one specimen from Palm Springs is the only example recorded from the latter station. Apparently the bottom lands of the Colorado River form the main winter home of the species in this region.

The series of skins from southeastern Arizona contains an excellent representation of both adults and juvenals, taken at all seasons of the year. The individuals of this series, although true in the main to the characteristics of the race, exhibit a certain amount of variation, apparently to be explained only as due to individual peculiarities. This is true of both adults and juvenals. As having bearing upon the extremes of variation encountered, mention might be made of the recorded occurrence of *drymoecus* at Calabasas, southern Arizona (Oberholser, 1898, p. 438). In the series before me there is a single individual taken in the Chiricahua Mountains, Arizona, October 27, 1914 (no. 2538, coll. of J. E. Law), that might be considered as belonging in the same category. This last mentioned bird is short tailed and rather dark colored, being not unlike certain examples of *drymoecus* in appearance, while it is even darker colored than selected specimens of *charienturus.* While this specimen in certain respects thus bears a casual resemblance to some California birds rather than to typical *eremophilus,* I cannot believe that it belongs to the race *drymoecus,* in the sense that this is an individual

that has actually traveled from central California to southeastern Arizona. Such action would be so remarkably at variance with all known conditions prevailing among the subspecies of *Thryomanes* of the central valley and coast regions of California that I do not for a moment consider that it is to be taken into account in explaining this circumstance.

As affording additional evidence to the contrary, there is in my series a molting bird taken in the Huachuca Mountains, Arizona, August 17, 1902 (no. 3082, Swarth coll.). This specimen, covered with pin feathers, and with rectrices and remiges but partly grown, is assuming a dorsal coloration far more rufescent than the average of *eremophilus,* freshly molted birds being used in comparison, and it is closely similar to the Chiricahua Mountain bird just described. Yet there can be but little doubt that this individual was in its summer home when captured, and that it is representative of an extreme of color variation occasionally reached in the subspecies *eremophilus.*

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