THE CALIFORNIA FORMS OF THE GENUS *PSALTRIPARUS*.[1]

BY HARRY S. SWARTH.

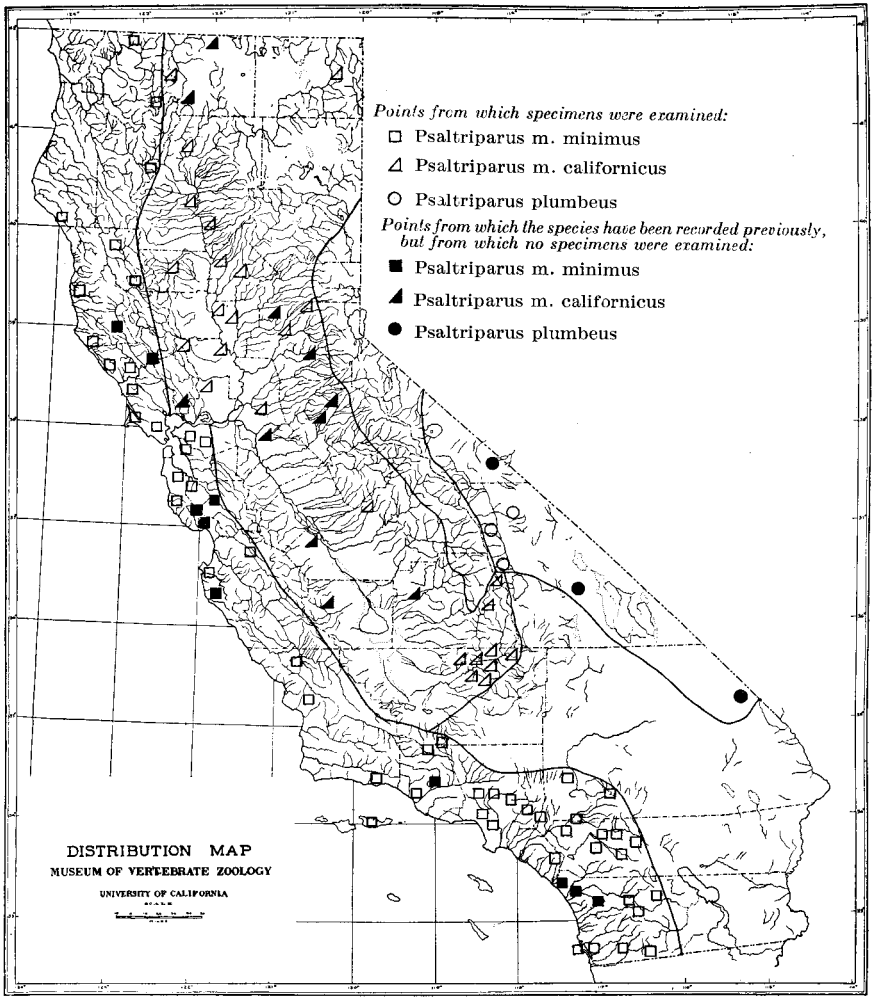
Plate XL.

INTRODUCTION: Throughout the greater part of California, bush-tits are familiar features of the bird life of the state. Their wide distribution, covering the Transition and Upper Sonoran zones, and parts of Lower Sonoran, gives them a range over most of the state, except certain of the desert regions and the boreal mountain tops, while the sociable and confiding nature of the birds brings them into intimate contact with all who care to cultivate their acquaintance. Consequently the many interesting and curious aspects of the life history, at least of the California species, are well known, having been observed and reported upon by various competent observers.

The status and relationships of the different races of the bush-tit, however, have not so far been worked out to a satisfactory conclusion, different authorities arriving at markedly different results, while none of them seems adequately to have covered the situation. This condition became more and more apparent with the growth of the ornithological collection of the Museum of Vertebrate Zoölogy. Series after series of bush-tits were brought in from various parts of the state, taken at all seasons of the year, and presenting a range of variation that apparently defied explanation by any known facts or theories regarding the species. The specimens finally brought together for the present study, however, over four hundred in number, seem to be quite satisfactorily representative of existing conditions in the genus in the state of California, enough so, I believe, to justify the publishing of the conclusions to which they have assisted.

Such a study as the present one is obviously incomplete. Although an excellent representation of material from California is available, yet the genus under consideration covers a much wider range than this one state, and the scrutiny of Californian specimens

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



DISTRIBUTION IN CALIFORNIA OF THE SPECIES AND SUBSPECIES OF PSALTRIPARUS.

inevitably suggests problems and questions to be answered only by means of extensive series from other points. My conclusions as herein stated refer only to the California forms of *Psaltriparus* — *P. minimus minimus, P. minimus californicus,* and *P. plumbeus.* Of the subspecies *P. minimus saturatus,* from the Puget Sound region (not included in the A. O. U. Check-List), the specimens at hand are too few in number to justify any expression of opinion. Of the Lower California form, *P. minimus grindæ,* no skins were examined. Neither did I have examples of any form of *P. melanotis,* and although the variations of this last mentioned species would seem to have little or no bearing upon any California problem, yet the relationships of *melanotis* to *plumbeus,* and of *plumbeus* to *minimus,* are such that only a general survey of the whole group, based upon at least as much and as satisfactory material from all regions as has been available from parts of California, could serve to explain certain of the questions that have arisen.

In the conclusions at which I have arrived I have been influenced throughout by one belief, a fact sometimes questioned, but of the truth of which both observation in the field, and the study of specimens, has convinced me. This is, that the various species of bush-tits, at least in California and Arizona, are absolutely resident wherever found. Under this conviction I have sought to explain every observed variation in specimens on any grounds other than that of the migration of one form into the habitat of another.

Perhaps it may be worth while to detail some of the evidence on which this belief is based. Some years ago I published (Swarth, 1900, pp. 14–16, 37–41) a list of birds observed at a point near Los Angeles, California. Of the one hundred and seventy-five species included therein only a small fraction were breeders, the bulk of the list being composed of migrants. Obviously this place was in an extensively used migration path. In many years' observation, continued long after this paper was published, but one solitary bush-tit was seen at this station, though some three miles to the northward, and perhaps a little farther southward, the species is locally a most abundant resident.

In all my experience I have never seen bush-tits in flight suggestive of migration. On the Berkeley campus, as one favorable place of observation, it seemed apparent that the same flocks of birds in

their wanderings traversed what appeared to be quite well defined paths, flitting from tree to tree, and along the same general lines of travel, at pretty regularly recurring intervals, week after week, throughout fall, winter, and spring. Of course it can not be proved that these were actually the same individuals, but the impression that they were was strongly conveyed. Other and similar corroborative evidence occurs to me, while on the other hand, as before stated, I have no recorded observations suggestive of any migrations by these birds.

Bush-tits, in southern California at least, do wander in late summer to higher elevations in the mountains than those at which they breed. Also the capture of birds in winter at such points as Palm Springs, on the Colorado Desert, or at Victorville, on the Mohave Desert, as recorded beyond, is undoubtedly due to their straying from the nearby mountains along some favorable, wooded river course, or similar attractive path. But these occurrences are not indicative of any regular migratory habits, which, as stated above, I do not believe to exist.

ACKNOWLEDGMENTS: The present study is based primarily upon the series of bush-tits contained in the collection of the Museum of Vertebrate Zoölogy, being in fact partly inspired by the desire to bring the Museum's catalogues into a more orderly and consistent arrangement, as regards this genus. The Museum's series, inclusive of the Grinnell, Morcom, and Swarth collections, contains at the present writing three hundred and fifty specimens of *Psaltriparus*. In addition to these a small number of skins was borrowed from several other sources, illustrative of various important localities not represented in the Museum collection. The writer wishes to express his gratitude to Dr. C. W. Richmond, Acting Curator, Division of Birds, of the United States National Museum, for the loan of typical specimens of *Psaltriparus minimus minimus*, and *P. minimus californicus;* to Messrs. Joseph Mailliard and J. W. Mailliard, for examples of *P. minimus minimus* from several critical California points; to Mr. William L. Finley, for skins from the Oregon State Game Warden's collection, and to Mr. Stanley G. Jewett, for some from his own collection, representative of both *P. minimus minimus* and *P. minimus californicus* from Oregon localities. There were also available the specimens in the Los An-

geles County Museum of History, Science and Art, where are housed the Daggett, Lamb, Law, Richardson, and Willett collections. Altogether, four hundred and thirty-three specimens were examined in the present connection.

VARIATION: There is probably hardly another species of bird, as plainly colored as the California Bush-tit and with as few distinctive markings, which shows such a wide range of variation in appearance in individuals taken under different circumstances. This variation has proved a constant obstacle toward an understanding of the several California species and subspecies of *Psaltriparus*, for it is only in large series taken at many different points that there appears to be any sign of law and order controlling the observed differences. Even the large number of specimens available in the present study is not sufficient to illustrate all of the phases of the situation, though it does appear to be ample for the deduction of the conclusions at which I have arrived.

Birds of this genus are subject to at least four kinds of variation. They differ: (1) seasonally, through fading and abrasion; (2) at different ages, adult and juvenal plumages being readily distinguishable; (3) geographically (the various species and subspecies, or geographical races); and (4) in one species, *melanotis* (not occurring in California), there is sexual difference, the male and female being strikingly different. But this last is a phase of the subject that need not be considered here.

SEASONAL VARIATION: The changes in appearance undergone during the year by the California Bush-tit (*P. minimus minimus* and *P. minimus californicus*), aside from the alteration brought about by the molt, are unusually striking for so plain colored a bird. In the Horned Lark (*Otocoris alpestris*), the Snow Bunting (*Plectrophenax nivalis*) and others, conspicuous patterns are revealed by the continued abrasion of the feathers; while in birds such as the Blue Grosbeak (*Guiraca cærulea*) the brilliant color of the whole body is disclosed through the same agency, but in the bush-tits there are no such underlying markings. The altered appearance is in this case largely due to change of color,— fading of the feathers, and not to the removal of feather tips differently colored from the rest of the plumage. The pileum and the remainder of the upper parts are differently colored in *P. minimus*, and are differently affected by

exposure during the year, so that various combinations result. This species varies seasonally to a much greater extent than does *P. plumbeus.*

The southern California series of bush-tits is the most extensive one available, and there are enough specimens from this region to illustrate the change in appearance during the year. Between birds in the freshly acquired plumage of October, and those in the frayed feathers of May and June, there is a vast difference. Selected specimens at hand, representing almost every week of the intervening period, laid out in chronological order, clearly illustrate the nature of the change, and show that there is some alteration in appearance from month to month almost throughout the year. There are sufficient specimens of bush-tits at hand from the central coast region of California, the Sacramento Valley, and the Sierra Nevada, to indicate similar seasonal changes in these birds also, though not enough material to illustrate every step of the transformation at any one point. *P. plumbeus,* as shown by series of skins from Arizona, Nevada, and east central California, undergoes practically the same process of change, though being a more uniformly colored bird, the variations are not nearly so striking.

As the described subspecies of the California Bush-tit, *P. m. californicus, P. m. minimus,* and *P. m. saturatus,* are largely distinguished by varying intensity of coloration, it follows that there is more or less 'overlapping' of this character in the various forms. Thus a faded example of *minimus* might be expected to bear a close resemblance to a fresh fall specimen of *californicus,* and similarly, a late spring *saturatus* would be much like a newly molted autumnal *minimus.* Of *saturatus* I cannot speak with certainty, having but one or two specimens available, but of *minimus* and *californicus,* although the above statement is approximately correct, other features remain which tend to distinguish the forms.

There is, however, still another angle to the problem, for in birds from different regions abrasion does not proceed with equal speed. This statement has also been made of the Red-winged Blackbirds Mailliard, 1910, p. 64), and is probably true of most birds. In general it appears that abrasion and fading produce much more marked results in an arid than in a humid region, though, as stated by Mailliard (l. c.), other factors enter into the question also.

It is customary on the part of many to speak slightingly of the custom of identifying specimens on geographical grounds, that is to apply to a certain example of bird the name of the subspecies supposed to occur at the point where this bird was collected, as sufficient grounds for identification. Even were this practice generally as objectionable as some appear to believe, it seems that in the California bush-tits we have a case where it can be done with perfect propriety. Examination of large series of specimens discloses the existence of certain different geographical races, each apparently resident within its own borders. The color variations of these races, however, are such that specimens of one, taken at a certain season, may closely resemble examples of another, taken at a different time of the year. Hence the collector of a few skins, taken at scattered points and different seasons, could easily be misled as to the significance of the variations or similarities he observes. It seems to me that, providing he assures himself of the pertinence of the limited comparisons possible to him, he is perfectly justified in naming his specimens on 'geographical considerations.'

MOLT: There is but one molt during the year. This takes place during the late summer, at the time of the conclusion of family cares of the adults, and when the young are molting into first winter plumage. The sequence of changes in *P. minimus minimus*, as illustrated in a series from southern California, is (omitting the natal down) about as follows:

Toward the end of May young birds begin to appear out of the nests, generally with wing and tail feathers fully developed, in other words in full juvenal plumage. This is worn without change for about two months, when, toward the end of July, the post-juvenal molt begins. There are several specimens at hand showing the inception of this molt: No. 3269, juvenal female, Reche Canyon, Riverside County, July 27, 1908; several new secondaries and some new greater wing coverts. No. 5214 (Grinnell coll.) juvenal male, Pasadena, July 29, 1902; at practically the same stage, with several new secondaries and some new coverts, but otherwise still in juvenal plumage. Other specimens at hand show this molt in progress until the end of September.

The annual molt of the adults is taking place at the same time, having begun a little earlier. Birds taken during June have the

plumage worn and faded, but as yet show no pin feathers. No. 2651, adult female, San Jacinto Mountains, July 11, 1908, is well started in the molt, with several of the old tail feathers still in place, but with stubby new ones also appearing, and with some new and some old flight feathers and coverts, and a mixture of new and old plumage over the body. No. 6100 (Grinnell coll.), adult male, El Monte, Los Angeles County, September 22, 1904, has almost accomplished the change, but careful scrutiny shows that the first (outer) primary has just begun to appear, and also that there are many pin feathers and some remnants of the old plumage, scattered over the head and body. One or two other specimens taken a little earlier in September are nearly as far advanced; but speaking in general it is not until the second week in October that the molt can be said to be entirely over. Two specimens taken at Witch Creek, San Diego County, October 10, 1908 (nos. 3994, 3995), are in perfect winter plumage, the earliest taken skins at hand of which this can be said. The molt is thus shown to be of quite long duration, about three months for adults, and a little less for the post-juvenal molt.

There are numerous specimens at hand collected in southern California during fall, winter, and spring, enough to show that while the birds undergo marked changes in appearance before the following summer, it is due entirely to fading and wear of the feathers. At the completion of the molt, post-juvenal or annual as it may be, adults and young are practically alike, and can no longer be distinguished by external appearance.

The molt of *P. minimus californicus* is illustrated in series from the Sacramento Valley and the Sierra Nevada. There are specimens in juvenal plumage taken in Yolo County, May 22 and later; birds beginning to molt, from the southern Sierras in Kern County, the third week in July; and adults and immatures with the molt not quite accomplished, from Placer County, the third week in October. The sequence of events is thus practically the same as in the southern California bird.

Of *plumbeus*, adults and juveniles from Arizona, Nevada, and east-central California show substantially the same changes over the same seasons.

PLUMAGE VARIATIONS AT DIFFERENT AGES: Besides the scanty natal down, worn for a short period by the nestling, there are appar-

ently but two distinguishable stages of plumage during the lifetime of the individual: (1) the juvenal plumage, acquired in the nest, and worn about four months; and (2) the first and subsequent winter plumages. Adults and immatures are, as far as I can see, absolutely indistinguishable after the autumnal molt, when the young bird loses the juvenal plumage, and the adult the faded and shabby last year's garb, and both don similar covering.

Following are detailed descriptions of selected juvenals and adults of the various California species and subspecies of *Psaltriparus*.[1]

Psaltriparus minimus minimus.

No. 2123; juvenal male in fresh, newly acquired plumage; San Jacinto Mountains, Riverside County, California; May 24, 1908. Pileum, buffy-brown; back, hair-brown; under surface of body, whitish, palest on throat, and darkening to drab-gray on sides and flanks.

No. 2529; juvenal male in very worn plumage; San Jacinto Mountains, Riverside County, California; August 25, 1908. Pileum, avellaneous; back mostly clothed in new feathers; plumage of under surface of body abraded so that most of the light colored tips of the feathers are worn away, and the dusky bases show through. The bird is generally dirty and faded in appearance.

No. 1623 (Grinnell coll.); male, in fresh, fall plumage; Pasadena, California; October 17, 1896. Pileum, olive-brown; back, rather darker than hair-brown; under parts darker than in the juvenal plumage, drab-gray on throat and median line of belly, darkening to drab on sides and flanks.

Although there are distinguishable dissimilarities in coloration between adults and juvenals, these differences are not great. They are accentuated, however, by the different textures of plumage in the two stages. The juvenal, with shorter and fluffier feathers, and with more extensively light-colored bases, gives a general effect that is rather mottled and uneven. The adult (first winter and later), with the plumage more dense and lustrous, has a generally smoother and better groomed aspect.

[1] In descriptions of colors Ridgway's *Color Standards and Color Nomenclature*, 1912, has been the basis for comparison.

No. 2531; adult male, in worn and faded plumage; San Jacinto Mountains, California; May 28, 1908. Pileum, buffy-brown; back, a somewhat clearer gray than in the fresh plumage of no. 1623 (described above). Under parts more distinctly whitish, with the darker drab color practically limited to a small area on the sides. Rectrices and remiges noticeably faded and frayed.

Psaltriparus minimus californicus.

No. 21059; juvenal female, in fresh, practically unworn, plumage; Weldon, Kern County, California; July 5, 1911. Pileum, buffy-brown; back, light grayish-olive. As compared with *minimus*, the upper parts are less brownish, and the under parts are of a clearer gray, with less dusky suffusion. The cap on the pileum is less sharply defined on the sides of the head.

No. 23319; male in first winter plumage (immaturity determined from condition of skull); Blue Canyon, Placer County, California; October 17, 1912. Pileum, fuscous; dorsal surface of body, dark olive-gray; ventral surface much paler — chin, throat, and upper breast, almost pure white, darkening to drab-gray on lower breast and abdomen.

Two adult males and another immature taken at the same time and place, are practically indistinguishable in coloration. A third immature male of the same series is appreciably darker, however; pileum, chætura drab; back, deep mouse gray; under parts less whitish and more dusky. A distinguishable feature separating this exceptionally dark colored example of *californicus* from *minimus*, is that while in the latter the darker colors tend more toward the brownish hues, in this bird the colors are more blackish. Although it is unusually dark colored, it is quite unlike any example of *minimus* at hand.

Psaltriparus plumbeus.

No. 5884 (Swarth coll.); male, in fresh, winter plumage; Huachuca Mountains, Arizona; October 12, 1907. Pileum, neutral gray; rest of upper parts grayish-olive. Under parts, whitish, with a slight dusky suffusion. A brownish colored area, including ear

coverts and cheeks, rather sharply defined against the white of the throat and the gray of the rest of the head and neck. Specimens taken in early spring (February, March, and April) have lost the olivaceous tinge on the dorsum, and the upper parts are uniformly clear gray. Summer specimens (May, June, and July) have the gray dulled by excessive wear of the feathers.

No. 9956; juvenal female; Huachuca Mountains, Arizona; July 15, 1896. Practically like adult. The gray of the upper parts is duller, less of a blue-gray, the brown cheeks are not so sharply contrasted against the rest of the head, and there is a faintly indicated black line over the auriculars and on the nape. Unlike the adults, the young of *plumbeus* exhibit considerable diversity in markings, and while the above described specimen represents the plumage perhaps most frequently encountered, there is a large proportion of birds with more or less extensive black markings on the head. In a few specimens there is no trace of head markings, a number have them faintly indicated, as in the specimen described above, and in others the patterns vary from a narrow line extending backward from the eye, to nearly as extensive a black marking as in the adult male of *P. m. lloydi* (see Swarth, 1913, pp. 399–401).

GEOGRAPHICAL VARIATION: It is, of course, the variation shown among individuals from different regions, the study of species and subspecies, that has attracted the attention of most workers in the group, and the present study of the genus, like most others, is the outcome of an attempt to correlate with definite geographic areas certain observed variations in a series of specimens.

Of recent years there have been published three authoritative accounts of the distribution of the species and subspecies comprising the genus *Psaltriparus*. These, in order of publication, are Oberholser's (1903, pp. 198–201) 'Synopsis of the Genus Psaltriparus,' Ridgway's (1904, pp. 423–436) treatment of the group in his 'Birds of North and Middle America,' and the A. O. U. Check-List, third edition (1912, pp. 352, 353). As regards the various races of *Psaltriparus minimus*, the contradictory nature of the statements contained in these works has caused much confusion among local students in California. This has resulted in a haphazard use of different names for the same bird, according to the authority consulted at the time, with, in recent years, a growing

tendency to ignore the subspecies *californicus.* Following are quotations of ranges as given in the publications cited.

Psaltriparus minimus minimus.

"Pacific coast region, from San Francisco Bay, California, to Washington" (Oberholser).

"West slope of coast mountains in Oregon, California, and northern Lower California, north to the Columbia River, south to Nachoguero Valley, Lower California (also to San Pedro Martir Mts., and San Fernando?)" (Ridgway).

"Transition and Upper Sonoran zones of the Pacific coast from southern British Columbia and northern Washington to northern Lower California" (A. O. U. Check-List).

Psaltriparus minimus californicus.

"California, excepting the northern coast region; northern Lower California" (Oberholser).

"Interior districts of Oregon and California east of the Cascade range in Oregon, and between coast mountains and crest of the Sierra Nevada in California; north to northwestern Oregon (Wilbur, Umatilla County), south to the valley of Kern River (Walker's Basin, etc.), southern California" (Ridgway).

"Transition and Upper Sonoran zones of Oregon and California (except coast strip) from northeastern Oregon to southern California" (A. O. U. Check-List).

Among these contradictory views it will be noted that one authority restricts *minimus* to the coast region north of San Francisco Bay, while another apportions both *minimus* and *californicus* to southern California. The ranges ascribed to *minimus* and *californicus* by Oberholser are similar to an earlier disposition of the races by Ridgway (1884, p. 89).

The results of the present study are most nearly in accord with Ridgway's later statements; that is, as regards distribution in California. There has been no Lower California material available, and while the few specimens at hand from the range of the northern form named *saturatus* are not appreciably different from apparently

comparable examples of *minimus*, still the material is not sufficient to warrant any generalizations.

Following are statements of the manner of occurrence in California of the species and subspecies of *Psaltriparus* found within the state, as deduced from the specimens assembled for the present study.

Psaltriparus minimus minimus (Townsend).

Type locality.— Columbia River, probably near Fort Vancouver, Washington.

Range in California.— Lower and Upper Sonoran zones of a comparatively narrow strip along the coast at least from the Oregon line south into northern Lower California. In northern California east to the Siskiyou and Trinity mountains; directly north of San Francisco Bay this strip is confined within extremely narrow limits; in southern California it extends to and includes the northern and eastern slopes of the San Gabriel, San Bernardino, San Jacinto, and Cuyamaca mountains. On Santa Cruz Island, of the Santa Barbara group.

Specimens examined from the following localities. Siskiyou County: Callahan; Horse Creek, Siskiyou Mountains. Shasta County: Tower House. Humboldt County: Shelter Cove. Mendocino County: Gualala; Covelo; Mendocino; Mount Sanhedrin. Sonoma County: Guerneville; Freestone; Seaview. Marin County: San Geronimo; Nicasio; Inverness; Point Reyes. Contra Costa County: Walnut Creek; Mount Diablo. Alameda County: Berkeley; Oakland; Piedmont. San Mateo County: Woodside; Pescadero. Santa Clara County: Palo Alto. San Benito County: Paicines. Monterey County: Pacific Grove. San Luis Obispo County: San Luis Obispo; Paso Robles. Kern County: Fort Tejon. Santa Barbara County: Santa Barbara; Santa Cruz Island. Ventura County: Ventura; Mount Pinos. Los Angeles County: Glendora; Claremont; Santa Monica Mountains; Cerritos; San Fernando; Pasadena; El Monte; Azusa; Los Angeles. San Bernardino County; San Bernardino; San Bernardino Mountains; Reche Canyon; Victorville. Orange County: Trabuco Canyon. Riverside County: Riverside; San Jacinto Mountains; Palm Springs. San Diego County: Jacumba;

Cuyamaca Mountains; Dulzura; Julian; Campo; Witch Creek; Point Loma; San Diego. Total number of specimens, 243.

Distinguishing Characters.— From the other two species of the genus (*P. melanotis* and *P. plumbeus*) *Psaltriparus minimus* is distinguished by having the pileum differently colored from the rest of the upper parts, forming a sharply defined "cap." *P. minimus minimus* as compared with *P. m. californicus*, is darker colored throughout, birds seasonably comparable being contrasted, the under parts are heavily suffused with dusky, and the flanks are more distinctly vinaceous. These differences are quite as apparent in the juvenal plumage as in the adult, sometimes more so. The general appearance of *P. minimus minimus* is of a *brownish* colored bird, as contrasted with the gray and white tones of *P. m. californicus*. In measurements *minimus* and *californicus* are practically alike. Compared with *plumbeus* they have shorter wing and tail, bulkier bill, and the same length of tarsus.

Remarks.— Of specimens representative of *P. minimus minimus*, there are available four skins from Portland, Oregon, practically topotypes of the subspecies. Three of these, adults taken in May, are from the collections of W. L. Finley (no. 255) and S. G. Jewett (nos. 845, 846); the fourth, a young bird, also taken in May, is from the collection of the United States National Museum (no. 149651). This series, though of few specimens, affords a good basis for certain comparisons.

In commenting upon the California collections of the various subspecies, a discussion of the series from each of the different localities seems to be the method most conducive to a clear understanding of conditions.

San Diegan District (specimens from San Diego, Orange, Riverside, San Bernardino, Los Angeles, Ventura, and Santa Barbara counties). The large number of skins from southern California, one hundred and sixty specimens from points ranging from San Diego to Santa Barbara, is fully illustrative of all seasonal variation. It has been possible, in fact, to make a selection of birds showing, almost week by week, the change in appearance throughout the year, and this has been most helpful toward an understanding of conditions presented in smaller series from other points.

As to the status of the southern California bird, it belongs un-

doubtedly to the subspecies *minimus*. Examples from this region are very dark colored, quite as much so as those from any other part of the coast district — in fact they average duskier on the under parts than specimens from any other point in California. The Portland specimens taken in May, mentioned above, are, it is true, somewhat darker colored than comparable birds taken during the same month in the San Diegan district; but this, I believe, is largely due to the more rapid rate of fading in the sunnier, more arid conditions of the latter region. February birds from Los Angeles are exactly like the May birds from Portland.

Furthermore, there is no evidence whatever of the existence in southern California of two forms of *Psaltriparus minimus*, along the coast and in the interior, respectively, as given by the A. O. U. Check-List. But one subspecies occurs in that part of the region inhabited by bush-tits, from the Pacific Ocean to the western edge of the Colorado Desert. It would be surprising if it were otherwise, for there is no other instance (except among the island birds) of two subspecies of any one species being resident in the San Diegan district.

Specimens are at hand from various outlying points on the boundaries of this district. Two winter birds from Victorville, at the edge of the Mohave Desert, are unquestionably *minimus*, and are doubtless wanderers from the neighboring San Bernardino Mountains. Birds from Mount Pinos, Ventura County, and the nearby station of Fort Tejon, at the southwestern extremity of Kern County, are likewise *minimus*, these localities representing the extreme limits of the subspecies in this direction. Four examples from Santa Cruz Island (nos. 3104, 3106, 3265, Mailliard coll., no. 5449 Grinnell coll.) are not to be distinguished from the form occurring on the adjacent mainland. Although the birds are doubtless resident upon Santa Cruz, the available material does not reveal development of any characters serving to distinguish a separate island race.

Santa Cruz District (specimens from San Luis Obispo, Monterey, San Benito, Santa Clara, and San Mateo counties). There is a relatively scanty amount of material from this region, but these few specimens are satisfactorily referable to *minimus*. In fact the only ones calling for comment are two March birds from Paicines, San

Benito County (nos. 6338, 6339, Mailliard coll.). These are appreciably paler than comparable specimens from southern California; and from the geographical position of the station the possibility is suggested of their being intergrades with *P. m. californicus*, which *may* be found to inhabit the adjacent San Joaquin Valley. Unfortunately there is not a single specimen of bush-tit available from this valley, the greater part of which is a treeless plain and unsuited to the species. There are parts, however, as in the immediate vicinity of the San Joaquin River, where the birds occur, recorded in fact from one or two points, and it will be of interest to learn to which of the races they belong.

San Francisco Bay District (specimens from Alameda, Contra Costa, and Sonoma counties). Many of the birds from the immediate vicinity of Berkeley and Oakland are strikingly dark colored, but this is undoubtedly due to staining of the feathers from the smoke of the nearby cities. Gardens and parks, filled with shrubbery, tempt the birds into the towns, to within a short distance of manufacturing and business centers, resulting in sooty plumage in the bush-tits, as with other species.

Three birds from Mount Diablo, Contra Costa County, as well as eight from the nearby station of Walnut Creek, are all clearly referable to *minimus*, demonstrating in this as with other species of animals, the relationship to the coast fauna of the inhabitants of this mountain, the easternmost outpost of the coast range at this point.

A series of nine specimens from Sonoma County (immediately north of San Francisco Bay), though on the whole referable to *minimus*, contains several light colored birds, possibly an indication of intergradation with *californicus* of the Sacramento Valley.

Northern Coast District (specimens from Marin, Mendocino, and Humboldt counties). This region should produce the darkest colored bush-tits of any portion of the state, reasoning from meteorological and geographical conditions, but the fact remains, surprising as it seems, that specimens from the southern portion of this region do not average as dark as those from the San Diegan district, and many of them are distinctly pale colored. One juvenile (no. 24099) is very similar to comparable examples of *californicus* from the Sacramento Valley. Certain July adults from the

coast of Mendocino County have faded on the upper parts to the exact color of July adults from the Sierras, though southern California birds of the same date are darker colored. On the lower surface, however, the Mendocino birds are distinctly dark, quite different from the gray *californicus*.

On the whole, of course, these coast birds are representative of *minimus*, but there is not nearly the difference between *minimus* of the northern coast district and *californicus* of the Sacramento Valley, to the eastward, that there is between southern California *minimus* and *californicus* of the southern Sierra Nevada.

Ridgway (1884, p. 89), in an early paper on the species, comments upon the paler colors of Marin County specimens, as compared with typical *minimus*, disposing of the question by regarding these birds as intergrades toward the grayer *californicus*, the range of which he at that time considered as including the coast of California south of San Francisco Bay. As the more southern birds are now known to be of the race *minimus*, and as, in fact, specimens from the southernmost extremity of the range of the subspecies are as dark colored as any, this explanation no longer holds. The possibility suggests itself that from the extremely narrow delimitations of the range of *minimus* in Marin, Sonoma, and southern Mendocino counties, compared with the vast area of country directly to the eastward swarming with bush-tits of the subspecies *californicus* (for, unlike the San Joaquin Valley, the Sacramento Valley presents conditions peculiarly favorable to the species), there is a constant influx of individuals of the more numerous race, *californicus*, continually encroaching upon the limited territory of the coast form. If the latter occupied a wider area the appearance of intermediates along the border line would not be particularly exciting of comment, but from the nature of conditions at this point these paler colored birds are distributed over the entire width of the restricted coast strip. It seems, in fact, as though there was here something similar to certain cases commented upon by Grinnell and Swarth (1913, p. 393), among problems concerning the distribution of various animals in the San Jacinto Mountains, California, where, from the narrowness of the region of blending of closely related subspecies, peculiar conditions ensue.

Among other observed results, types of either one of two strongly

contrasted faunas were found encroaching to a marked extent into their neighbor's territory, Colorado Desert forms into the San Diegan district, and vice versa. In the particular case in point we can well conceive of the coast bush-tits throughout this peculiarly attenuated strip of appropriate territory being dominated by the sheer numbers of continually dispersing individuals of *californicus*, and the distinguishing subspecific characters of the birds suffering in consequence.

South of San Francisco Bay the humid coast strip (Santa Cruz district) though narrow, is sharply cut off from the violently contrasted San Joaquin Valley, which is besides almost destitute of possibly competing bush-tits, hence there is every reason for the coast birds preserving their distinctive characters. To the northward, beyond Marin County, the coast region is also definitely separated from the interior valleys; but immediately north of San Francisco Bay, in southern Marin and Sonoma counties, the mountains, which here closely approach the coast, become so low and broken as to lose much of their effectiveness as barriers, and, as suggested above, there is little to hinder the influx of birds from the Sacramento Valley, densely populated with bush-tits of the subspecies *californicus*. It may well be that not only the peculiar observed conditions among the bush-tits, but also similar instances encountered among certain other birds of the same region, are to be explained by the peculiar combination of circumstances at this point. These conditions briefly summarized, are: 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.

Northcentral California. Small series of skins at hand from the Siskiyou Mountains, in extreme northern Siskiyou County, and from the Trinity Mountain region in southeastern Siskiyou County and northwestern Shasta County, prove rather difficult to allocate. It seems apparent, however, that these birds must be considered as intergrades between *minimus* and *californicus*, though obviously nearer the former. In fact certain of the specimens are not to be distinguished from typical examples of *minimus* in comparable plumage, though others from the same localities evidently tend

toward the grayish type. It is evident that in this part of the state an arbitrary line must be drawn between the ranges of the two subspecies, and from the material available at the present writing, it seems as though this division may be indicated about through the middle of Siskiyou County. The single specimen at hand from Yreka is of the *californicus* type, and there are others of similar character from southcentral Oregon.

Psaltriparus minimus californicus Ridgway.

Type locality.— Baird, Shasta County, California.

Range in California.— Lower and Upper Sonoran zones chiefly. In extreme northern California from central Siskiyou and western Shasta County east to the Nevada line; throughout the Sacramento Valley; possibly in the San Joaquin Valley (?); on the western slope of the Sierra Nevada everywhere below Boreal, and on the eastern slope, the same zones, north to Carroll Creek, Inyo County; south to the southern extremity of the Sierras (numerous specimens from points on Kern River, Walker Basin, etc.), the Greenhorn Mountains, and, the southernmost point of record, the Piute Mountains.

Specimens examined from the following localities.— Siskiyou County: Yreka. Shasta County: Baird. Tehama County: Tehama; Red Bluff. Glenn County: Winslow. Butte County: Chambers Ravine; Chico. Sutter County: West Butte; Marysville Buttes. Yolo County: Grand Island; Rumsey. Solano County: Vacaville. San Joaquin County: Tracy Lake. Modoc County: Warner Mountains. Placer County: Blue Canyon; Gold Run. Madera County: Raymond. Tulare County: Cannell Meadow; Trout Creek. Kern County: Fay Creek; Weldon; Greenhorn Mountains; Kiavah Mountain; Bodfish; Isabella; Walker Basin; Piute Mountains. Inyo County: Carroll Creek. Total number of specimens, 110.

Distinguishing Characters.— As compared with *P. minimus minimus*, of clear gray and white tones of color, rather than of the brownish hue of that subspecies. Typical *californicus* is often almost pure white beneath, noticeably so in the juvenal plumage. Sides and flanks slightly or not at all tinged with vinaceous.

Remarks.— There are at hand three specimens from Baird, Shasta County, California, the type locality of *californicus*. Judging from the available material it seems unfortunate that a Shasta County specimen was selected as the type of the paler colored inland race of the California bush-tit, for the locality is at the extreme edge of the territory occupied by the subspecies, and individuals from this point do not exhibit the best manifestation of the characters of the form. Birds taken but a short distance west of the type locality of *californicus* must perforce be assigned to the subspecies *minimus*, while topotypes of *californicus* are more of the nature of intergrades beween the pale inland and dark coast races. This view is quite in accord with the recognized faunal position of the Shasta and Siskiyou regions (see Merriam, 1899; Anderson and Grinnell, 1903).

Sacramento Valley (specimens from Tehama, Glenn, Butte, Colusa, Sutter, Yolo, Yuba, Solano, and Sacramento counties). Birds from the Sacramento Valley may be regarded as unquestionably representative of the pale, interior subspecies. They are distinctly grayer than birds from Shasta and Siskiyou counties, to the northward, and are closely similar to Sierra Nevada birds. Juveniles from the two regions (Sacramento Valley and Sierra Nevada) are, in fact, practically indistinguishable; adults from the former point are perhaps a trifle darker, and are more distinctly vinaceous on the flanks.

Segregated series from the eastern and western sides of the Sacramento Valley do not show any correlated differences. In other words, although the Sacramento Valley series as a whole tends slightly toward *minimus*, compared with the exceedingly gray Sierra birds, there is no perceptible darkening from the eastern to the western sides of the valley. Eight April adults from Sutter County (Sacramento Valley) are slightly darker than three birds from Raymond, Madera County (in the western foothills of the more southern Sierras), also taken in April. These series contain about the best seasonably comparable adults available from the two regions, though there are plenty of juveniles and old birds in worn plumage, and tend to confirm the relative positions above accorded the birds from these sections.

Warner Mountain District (specimens from Sugar Hill; Dry

Creek; Parker Creek). A series of sixteen specimens (eight adults and eight juveniles) from this section, presents several points of interest. These birds, together with those from the Sierras, exhibit the extreme of grayness in appearance reached by any bush-tits of this species. Comparing Warner Mountain and Sierra Nevada birds, taking comparable adults and young of each, there are no distinguishable differences in coloration. In measurements the former average a trifle larger. In each of the two series there are individuals in which the pileum is much less markedly contrasted with the back than is the case with specimens from any other point. In an adult male from the Warner Mountains (no. 15297) the difference in color on pileum and back is hardly appreciable, nor are the two areas sharply separated. This bird is strikingly similar to an adult male from the east slope of the Sierra Nevada which I have referred to *plumbeus* (see beyond), in which there is nearly as distinct a suggestion of a cap, differently colored from the back.

The Warner Mountain birds average somewhat larger than specimens of *californicus* from other points, as on the western slope of the Sierras. Aside from this slight difference, however, they apparently are not to be distinguished from examples from the central and southern Sierra Nevada. Unfortunately there is a dearth of data and specimens from much of the region intervening between the central Sierras and the Warner Mountains, and whether or not there is continuous distribution of bush-tits between is one of the points remaining to be worked out.

Sierra Nevada (specimens from Placer, Madera, Tulare, Kern, and Inyo counties). Fifty-one specimens are available from the general region indicated above. In this representation there are small series from two different points on the western slope of the Sierras, of particular interest when considered together. These are: Three males from Raymond, Madera County, taken April 19 and 20, 1911; and six males from Placer County: two adults, Blue Canyon, October 17 and 20, 1912; three immatures, Blue Canyon, October 17 and 20, 1912; one male, age not indicated, Gold Run, October 19, 1902. The Placer County birds have all nearly or quite acquired their fresh winter plumage, and may be considered as presenting the true colors of the subspecies *californicus*, unmodified

by any external influence. The Raymond specimens may be regarded as unquestionably illustrating the same plumage after subjection to the extreme effects of fading, but before excessive abrasion reduces all the feathers to the uniformly dirty and undistinctive appearance seen in midsummer specimens.

The differences shown in these two series is little less than startling, being quite as great, though of a different nature, than those distinguishing certain subspecies, or even species, in the genus. In the October birds the general effect is of dark gray and slaty tones, with no suggestion of brown anywhere. To speak exactly, the tops of the heads of these birds (as described elsewhere in this paper) are variously fuscous and chætura drab. In the Raymond (spring) birds the dark gray and slaty body colors have become a clearer gray above, and nearly pure white beneath, while the pileum is buffy-brown. With the two extremes brought suddenly to the attention, it is hard to realize that the observed differences are merely seasonal changes, such as are undergone by any one individual during the year; but that this is the case is forcibly proven by the comparable changes traced through the seasons in the extensive series of *minimus* from the San Diegan district, as previously described, as well as by certain examples of *californicus* showing intermediate stages.

Of the numerous specimens at hand from Tulare and Kern counties, in the southern Sierras, the majority are juveniles, and the comparatively few adults are either in very worn plumage or are undergoing the annual molt. The entire series, both old and young, shows to an extreme degree the pale coloration of this race, and placed in apposition to a comparable series of *minimus*, the difference is strikingly apparent. Sierran birds present the utmost degree of grayness reached in the subspecies *californicus*, equalled only by specimens from the Warner Mountains. Sacramento Valley birds are slightly darker, the difference being more noticeable in adults than in the young. Juvenals from the Sierras and from the Sacramento Valley are practically indistinguishable.

There are three specimens at hand (Richardson coll., nos. 1023, 1025, 1031) collected in the Piute Mountains, Kern County, November 26, 1907. This small mountain range is a southern outpost of the Sierra Nevada, and it is noteworthy that these birds, in fresh

fall plumage, are distinctly referable to the Sierran subspecies, *californicus*. The peculiar interest attaching to this occurrence lies in the fact that with certain other California birds comparable to the bush-tits in local divisions and distribution, we find at the extreme southern Sierras the southern California (San Diegan district) representative, rather than the more northern form. Two of the California towhees (*Pipilo maculatus megalonyx* and *P. crissalis senicula*), and a thrasher (*Toxostoma redivivum pasadenense*), are examples in point. In fact, from the preponderance of southern California forms in this region, the latest published map of the faunal areas of California (Grinnell, 1913, Plate XVI) shows the San Diegan district as extending northeast into southern Tulare County. With the bush-tits, however, the San Diegan representative, *minimus*, appears to be closely confined to the region west from, and inclusive of, the coastal ranges. Examples at hand from Fort Tejon and Mount Pinos are clearly *minimus*, apparently the northeastern extreme reached by the subspecies in this region. The Piute Mountain birds described above, are just as clearly *californicus*. These two stations are approximately sixty miles apart, and are apparently the two points at which the subspecies *minimus* and *californicus* most closely approach one another in this part of the state. The intervening region is mostly barren desert, unfitted to the species.

There are five immature birds at hand from Carroll Creek, Inyo County, this apparently indicating the northern limit of *californicus* on the eastern slope of the Sierras. Collecting was carried on at points immediately to the northward, where only *plumbeus* was found.

Psaltriparus plumbeus (Baird).

Type locality.— Little Colorado River, Arizona.

Range in California.— Desert region of the southeastern portion of the state, in Mono, Inyo, and northern San Bernardino counties. A discontinuous range, being confined to the Upper Sonoran zone of the various desert mountain chains and the east slope of the Sierra Nevada, these tracts being separated by vast expanses of Lower Sonoran, uninhabited by the species. Has been found in the Providence Mountains, on New York Mountain (at the east end

of the Providence Mountains), in the Panamint, Inyo, and White mountains, and on the east slope of the Sierra Nevada, from Carroll Creek at the south, northward an undetermined distance.

Specimens examined from the following localities.— Inyo County: Mazourka Canyon, Inyo Mountains; Carroll Creek, Lone Pine Creek, and Kearsarge Pass, Sierra Nevada. Total number of specimens, 10.

Distinguishing Characters.— Coloration of adults uniformly grayish throughout, with no distinctive markings. Upper parts gray; in fresh fall plumage the dorsum is tinged with olivaceous, in slight contrast to the head. No decided markings on head, though the cheeks are brownish, rather sharply defined against the gray of neck and white of throat. Under parts pale gra[illegible]tically pure white in worn plumage; the flanks frequently [illegible] with vinaceous. Juveniles are usually plainly marked as are the adults, but frequently exhibit head markings of varying extent and sharpness, similar to those seen in *P. melanotis.* In measurements, *plumbeus* as compared with *minimus* has wing and tail longer, tarsus the same, and bill (both in length of culmen and bulk) smaller.

Remarks.— Besides the California specimens listed above, there have been available for comparison series from southern Arizona and from Nevada, numbering thirty-seven and seventeen skins, respectively. These satisfactorily illustrate seasonal variation in plumage, and the series also contain a good representation of birds in juvenal plumage. The California specimens are for the most part absolutely like those from Arizona and Nevada. Birds from the Inyo Mountains and Kearsarge Pass, taken in May and June, are in worn breeding plumage, and are indistinguishable, either in color or measurements, from comparable examples from other regions.

Two specimens from the Sierra Nevada, however, are deserving of special notice. These are no. 22657, an adult male, taken on Lone Pine Creek, April 13, 1912, in comparatively unworn plumage; and no. 21092, also an adult male, taken on Carroll Creek, September 9, 1911, about two-thirds through the annual molt. The Lone Pine bird has a distinctly perceptible "cap" on the pileum, not nearly as marked as in full-feathered examples of *californicus* from the

Sierras, but little less distinct than in a single specimen from the Warner Mountains (no. 15297). In the Carroll Creek bird the cap is not so obvious, but might become more distinct with the completion of the molt. The measurements of both these birds coincide with those of *plumbeus* rather than *californicus*.

It will be noted that these specimens, of intermediate nature, were taken at the extreme southwestern limits of the range of *Psaltriparus plumbeus*. The ranges of this species and *P. minimus californicus* adjoin at this point, typical examples of the latter being taken at Carroll Creek, at the same time and place with the aberrant specimen of *plumbeus* described above. It will also be noted that one specimen of *californicus* from the Warner Mountains, previously described, shows a decided leaning toward the characters of *plumbeus*. In other words, at the one point where the ranges of *Psaltriparus plumbeus* and *P. minimus californicus* are known to touch, and at one other point, an extreme eastern outpost of the latter subspecies, we find specimens of intermediate character, with difficulty referred to either one of the two. This is suggestive of much closer relationship between them than has heretofore been suspected, and it may be that further collecting and observations in debatable territory will demonstrate the differences to be merely subspecific, necessitating a return to the trinomial, *Psaltriparus minimus plumbeus*, formerly in use.

At present, however, the facts hardly justify such a radical step. In the first place, the region of blending, even if its existence may be considered as established, is obviously very narrow, while the intermediate specimens are almost of the nature of hybrids. There is no *gradual* change from the characters of one species to the other, examples of *plumbeus* from the Sierras being for the most part indistinguishable from Arizona and Nevada specimens. It is of decided interest to note the existence of these doubtful specimens, as another example of the different kinds of intergradation, and varying degrees of difference, to be found between what we call species and subspecies of animals.

In commenting upon *P. plumbeus* at the eastern border of its range, where it meets *P. melanotis lloydi*, Ridgway (1904, p. 430, footnote) remarks: "The relationship of this form to *P. melanotis lloydi* affords a problem very difficult of solution and of exceptional

interest in connection with the discrimination between species and subspecies. Judging from specimens alone, it is difficult to escape the conclusion that the two forms intergrade completely; at least I find myself unable to satisfactorily refer a very large percentage of specimens obtained within the area of overlapping of their respective ranges. But Mr. Oberholser, who has had excellent opportunities of studying both forms in life, assures me that they not only both breed in the same localities in southwestern Texas, but that they each have distinctive peculiarities of voice, etc. It is true that apparent intergradation does not involve adult males, which are always very distinct, the difficulty being in distinguishing those females and some young examples of *P. m. lloydi* which have no black on the head from adults (both sexes) of *P. plumbeus.*"

These statements are partly applicable to conditions existing at the opposite, western border of the species' range, where *P. plumbeus* meets *P. minimus californicus*, in that, as shown above, specimens were found with difficulty referred to either species. It can not be urged in this case, however, that the two have any distinctive peculiarities of voice or habits serving to indicate specific difference, for in the writer's experience there are absolutely no such distinguishing characteristics. Also no evidence of intergradation in the juvenal stage is at hand, no undoubted example of *plumbeus* in juvenal plumage being secured in the debatable territory. The specimens regarded as intergrades are all mature birds. But as the young of *plumbeus* from other parts of its range exhibit characters remarkably similar to those of *P. melanotis*, it would be surprising to find them here developing features similar to *P. minimus*.

The whole problem of the inter-relationships of the three species of *Psaltriparus* is one of decided interest, the facts so far accumulated being of a suggestive, though tantalizingly inconclusive, nature. The three species have a continuous distribution, *melanotis* the farthest to the south and east, *minimus* to the north and west, and *plumbeus* occupying middle ground and impinging upon the territories of each of the others. *Melanotis* and *minimus* have peculiar and different head markings, while *plumbeus* is a plainly and uniformly colored bird. The interesting fact has already been developed (Swarth, 1913, p. 399) that in *plumbeus*, the middle link

in the chain, the young sometimes develop a startling similarity to the adult female, occasionally even to the adult male, of *melanotis*. From the present study it is evident that adults of *plumbeus* at a point of meeting with *minimus* are sometimes of the nature of intergrades towards this western form.

Ridgway (1904, p. 430) evidently strongly inclined toward a belief in the existence of intergradation between *melanotis* and *plumbeus*, and in the specimens discussed in the present paper there is shown apparent blending between *plumbeus* and *minimus*. This somewhat alters our conception of the relationships of the various forms of *Psaltriparus*, and results in a much closer linking together of the three generally recognized species. I have no intention here, however, of formally proposing the reduction of the known forms of *Psaltriparus* to subspecies under one species. We obviously cannot express all the inter-relationships of different forms in our nomenclature, and the generally accepted present treatment of the species and subspecies of the genus *Psaltriparus* seems more satisfactory than any such change would be. It seems evident though, that in the three forms, *melanotis*, *plumbeus*, and *minimus*, there are to be distinguished three branches of a parent stem which have diverged to a point where we are just able to detect traces of their former union.

Through some females and young of *melanotis* and young of *plumbeus*, we can observe apparent blending between these two, for the assumption of features of *melanotis* by the young of *plumbeus* would appear to be either a reversion to common ancestral characters on the part of the latter, or else it is a rather remarkable case of parallel development, with, in one species, greater specialization in the young than in the old, and specialization exactly such as is shown in a neighboring race. The former belief seems the more reasonable. The mergence of *plumbeus* and *minimus* is of an abrupt and broken nature. From these facts it seems as though the three 'species,' *melanotis*, *plumbeus*, and *minimus*, had advanced in their evolution to a point where the connecting links were almost eliminated, only faint traces of their former close union still being visible. The intermittent appearance of peculiar characters in the juvenal plumage of one of the species, and the occasional production of what appear to be hybrids, may be taken as evidence of this nature.

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MEASUREMENTS IN MILLIMETERS (AVERAGE, MINIMUM AND MAXIMUM) OF SERIES OF *PSALTRIPARUS*

	Wing	Tail	Culmen	Tarsus
Psaltriparus minimus minimus	46.8	52.05	7	15.8
10 males from Los Angeles Co., California	(46–48)	(50–54)		(15–16)
Psaltriparus minimus californicus	47.2	52.01	7.1	15.8
10 males from the Sacramento Valley, California	(46.5–49)	(50–54)	(7–7.5)	(15–16.5)
Psaltriparus minimus californicus	49.5	53.7	7.4	15.8
9 adults from the Warner Mts., California	(48–50.5)	(51–58.5)	(7.2–8)	(15–16.5)
Psaltriparus minimus californicus	47.8	52.3	7.1	16.3
5 adults from the Sierra Nevada, California	(47–48.2)	(51.5–54.5)	(7–7.2)	(16–16.5)
Psaltriparus plumbeus	51	55.3	6.1	16.3
8 adults from Inyo County, California	(50–52)	(52–59.5)	(6–6.5)	(16–16.5)
Psaltriparus plumbeus	50.4	55.05	6.1	15.6
10 males from the Huachuca Mts., Arizona	(49–51)	(53–57.5)	(6–6.5)	(15–16)
Psaltriparus plumbeus	51.3	55.5	6.1	16.1
5 adults from Humboldt County, Nevada	(50.5–52.5)	(53.5–60)	(6–6.5)	(16–16.5)

A REVIEW OF THE GENUS PHŒBETRIA.

BY JOHN TREADWELL NICHOLS AND ROBERT CUSHMAN MURPHY.

Plate XLI.

THE possession by the American Museum of Natural History and the Brooklyn Museum of a series of skins of *Phœbetria palpebrata antarctica* from South Georgia Island in the Subantarctic Atlantic, and of two specimens of *Phœbetria fusca* from the temperate South Atlantic, has led us to assemble additional material for purposes of comparison. Our study brings us to the conclusion that the east Pacific, or American west coast, Sooty Albatross, which is the *Diomedea fusca* of Audubon and the *P. palpebrata* of the latest A. O. U. Check-List, (1910), belongs to an undescribed race of *palpebrata*. A review of the genus in the light of the material examined may aid future workers.

The characteristics which differentiate the two well-marked species *palpebrata* and *fusca* can be comprehensively stated in the form of a key:—