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UNITED STATES GEOGRAPHICAL SURVEYS WEST OF THE ONE HUNDREDTH MERIDIAN.

CAPTAIN GEO. M. WHEELER, IN CHARGE.

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ORNITHOLOGICAL REPORT

UPON

COLLECTIONS MADE IN PORTIONS OF CALIFORNIA, NEVADA,
AND OREGON.

BY

H. W. HENSHAW.

EXTRACTED FROM ANNUAL REPORT OF THE SURVEY FOR 1879.

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APPENDIX L.

ORNITHOLOGICAL REPORT FROM OBSERVATIONS AND COLLECTIONS MADE IN PORTIONS OF CALIFORNIA, NEVADA, AND OREGON, BY ASSISTANT H. W. HENSHAW.

UNITED STATES ENGINEER OFFICE,
GEOGRAPHICAL SURVEYS WEST OF THE 100TH MERIDIAN,
Washington, D. C., April 21, 1879.

SIR: I have the honor to transmit the following report upon the ornithology of the regions visited by me during the field seasons of 1877 and 1878.

Very respectfully, your obedient servant,

H. W. HENSHAW.

Capt. GEORGE M. WHEELER, U. S. A.,
Corps of Engineers, in charge.

The present report includes an enumeration of the birds met with during the field seasons of 1877 and 1878 by the writer, with more or less extended notices of their habits, relative abundance or scarcity, extent of habitat, &c., &c., from original field-notes and observations. To but a limited extent has it been thought advisable to depart from the rule of including only results accruing directly from the expedition, and to indicate briefly general facts respecting the distribution of species elsewhere, as compared with the region under consideration. In the instance of a number of the puzzling forms met with, a careful study has been made of their relations with allied species and the results included in the present connection; but in the main the notes bear directly upon the area included in the examinations of the survey for the time specified.

In 1877, field-work in connection with Party No. 1, California Section, extended from the 12th of May to the 1st of October. The following year and with the same party, the interval between July 18 and October 1 constituted the field season. Unfortunately in the latter year work began at so late date that the much desired opportunity was lost of presenting in the present report a full account of the very considerable number of species inhabiting this region, of whose nesting habits little or nothing is known. The notes therefore that bear upon this part of the birds' histories were obtained during the early portion of but a single season.

The routes followed during the two years amounted practically to a continuous line from Carson, near the western border of Nevada and a little south of the Central Pacific Railroad, to The Dalles, on the Columbia River. A considerable portion of the time was spent in the mountains, but more in the valleys and on the plains that lie at their eastern bases. Thus opportunity was had, so far as the necessities of the topographical parties to which the writer has usually been attached would permit, to make a comparative study of the birds of the several sections entered. Taken in connection with what has hitherto been accomplished in the same region, and especially with the very valuable report of Dr. J. C. Newberry, made in 1855, it is thought that the avifauna of the eastern slope, in its general features, may be considered as pretty well made out. Perhaps a brief glance at the area covered in the present report, in its relations to contiguous regions, may be of interest.

The Sierra Nevada of California, in its entire length, and the Cascade Mountains of Oregon form essentially a continuous chain of peaks, which constitutes the first real obstacle to the extension of animals and plants to the westward that is encountered after the main chain of the Rocky Mountains, the "backbone" of the continent, has been passed. So far, at least, as the extension of birds is concerned, it appears to be an extremely effectual one, and the rocky barrier thus constituted may be taken as limiting with precision the Middle Faunal Province.

Attention has elsewhere* been called to the fact that the influence of the Pacific province is visible in the birds of the eastern slope, and the conclusion drawn from a study of its avian life, that, while by no means a typical portion of that province, it is yet sufficiently dashed by Pacific province forms as to more properly be included in that zoological division rather than with the middle region. The number of species and varieties of birds typically representing the Pacific province that are found along the eastern slope is not very great, since, of course, they are limited to mountain-inhabiting forms that constitute but a small proportion of the aggregate number belonging thereto. On the other hand I know of but four species strictly attributable to the middle region that reach into the mountains of the eastern slope, viz, *Turdus pallasi auduboni*, *Carpodacus cassini*, *Pica melanoleuca hudsonica*, and *Tetrao obscurus*. That the

* Annual Report of Geographical Surveys West of the One Hundredth Meridian, 1877, p. 1304 *et seq.*

number should be so small seems at first thought strange, when it is remembered that the low elevations just east of the mountains are unmistakably middle province in the character of their avifauna.

With reference to the geological structure of the Deschutes Basin and other areas just east of the Sierra and Cascade Ranges, Dr. Newberry affirms their intimate connection with the Rocky Mountain Desert; nor in considering the flora and fauna of these areas does he fail to note many examples that serve to indicate their closer affinity to the Rocky Mountain region than to the Pacific.

In the case of birds the physical obstacles to be surmounted, formed by the high mountain crests, although doubtless not without effect, have probably far less to do with the absolute limitation of species than has the check offered by the conditions of a different climate, with the consequent change in plant and insect life which this implies. The region west of the mountains has a large mean annual rainfall, the effect of which upon plant and animal life is further maintained during the dry season by the accession of moisture from the ocean; but the moisture-laden winds are finally robbed as they pass eastward over the summits of the mountains, and they reach the distant interior dry and without life-giving power. As a consequence, and in connection with its volcanic character, the interior plateau country, almost rainless during the summer, is, for the most part, dry and barren in the extreme. The oases, in fact, in this general desert are limited to the areas which, through geological disturbances, have been uplifted to a sufficient height to intercept cloud moisture; and, in addition, the banks of the streams, which afford restricted ground for the growth of vegetation, and through it a home for animal life. With the above well-defined differences of climate, it is not surprising that a corresponding change in the flora and fauna of the two regions is observable.

Although, as stated, the Sierra and Cascade Ranges present in the main a continuous chain, its continuity is interrupted in several places, the Columbia, the Klamath, and the Pitt Rivers breaking through its wall in their progress to the Pacific. Nevertheless, the presence of the natural passes thus afforded does not appear to have a marked effect upon the distribution of birds and mammals, if, indeed, it is to be detected at all. The narrowness of their cañons, flanked as they are in the case of the Columbia by extremely dense coniferous woods, and of the others by an inhospitable desert-like country, would probably have an effect in preventing the passage of species back and forth, were there no other existing cause. But, as remarked before, probably the main obstacle is to be found in the different climates of the two regions. Those species habituated to the warmer, more equable, and moist climate of the Pacific side, and to a country covered with profuse vegetation, would naturally be repelled by the harsher climate and dry, desolate country to the eastward; while such as are inured to the latter conditions would find the former equally unattractive. As further evidence that it is chiefly the climate and the conditions resulting therefrom that limit the range of birds, and not the mere physical barriers offered by mountain chains, it may be remarked that, by no means the same amount of difference is to be observed between the birds of the regions that lie contiguous to the eastern and western slopes of the Rocky Mountains that is to be noted here. And we may safely infer that the very marked faunal similarity of the latter sections is largely due to the corresponding similarity of climates, the Rocky Mountains appearing to have little or no effect in limiting the range of birds and mammals.

In a region possessing the forbidding aspect of that to the east of the Sierras, it might be inferred that the sum total of bird life would be rather small. In general, this is true; but along the streams there is usually to be noticed a rather marked concentration of species, while in some favored localities the number also of individuals is great. The mountainous districts, with their heavy growth of conifers and deciduous shrubs, as well as their profusion of annual plants, which up to a certain limit accompany the increased amount of rainfall, form the home of numerous species not found elsewhere. In fact, the more favorable localities in the mountains form the best collecting grounds for the naturalist.

A somewhat special type of country was entered during the past season in the Deschutes River region, the general watershed of which stream has elsewhere been termed the "Deschutes Basin." As it is peculiar in some of its aspects, this region merits brief mention. With a general elevation of about 4,000 feet above sea-level, much of this area is covered by a uniform growth of the yellow pine (*Pinus ponderosa*), which appears to thrive wonderfully well in the light soil of pulverized pumice. From the fact that the water supply is extremely limited and occurs for the most part only as small springs or in water-holes, very few shrubs and plants are able to maintain existence, and a hardy kind of grass alone covers the soil with a scanty growth. So far as birds are concerned, it would be difficult to realize a more complete type of desert than is here presented. For days in succession, I have ridden through these forests, the mules each step sinking above the fetlock in the treacherous dust, which, rising in clouds, marked the route of the party as by a column of smoke, scarcely seeing or hearing a bird. The rare note of a woodpecker or nuthatch, or the chirpings of a few venturesome snow-

birds, alone broke the silence of the woods. Even along the banks of the Deschutes there was noticeable at the time of my visit, in September, a remarkable poverty of birds. This I attributed, in the lack of other apparent causes, to the fact that the shrubbery of its banks consisted only of willows, while a heavy growth of coarse grass replaced the bright flowers and varied vegetation of higher altitudes.

Notable as are these forest deserts for absence of bird-life, they yet form the home for thousands of mule-deer and antelope. The former, although generally dispersed, center in greater numbers in certain spots, which are regulated probably by their accessibility to water, and not a day passed without many being started by our train.

The mule-deer, as nearly as we could learn, reaches only into the mountains of the eastern slope, and does not pass the summit; a somewhat singular fact in regard to its distribution, since it reaches quite to the coast in the region south of San Francisco. To the west, in Northern California and Oregon, it is replaced by the Pacific black-tailed deer (*C. columbianus*). This animal, while in the main confined to the region west of the mountains, was ascertained to cross the range at a number of points and inhabit the same sections as the *C. macrotis*. This, however, is the exception rather than the rule, the eastern slope, as a rule, appearing to be free from its presence.

Along the Deschutes River we met with the white-tailed deer, the so-called *C. leucurus*. In comparison with the mule-deer it was not numerous, and its range appeared to be confined to the river-bottom and to the forest closely adjacent.

The antelope, typically an animal of the open grassy plains, concentrates more in the "deadening," which are often of many hundred acres in extent, or live in the sections where the pines dwindle away and are replaced by a growth of cedar. Still, they were not infrequently met with in the pine woods, their haunts here thus furnishing a strong contrast to the usual home of the species further east.

In connection with my work, my grateful thanks are due for the many courtesies and very material assistance rendered by my friend Mr. H. G. Parker, of Carson, Nev. I am also greatly indebted to Maj. J. M. Norvall, at the time of my visit in command of Camp Bidwell, for the generous hospitality received at his hands. During my stay with him every possible aid to my investigations was freely extended. I would also gratefully mention the aid received from my friend Mr. Robert Ridgway, of the Smithsonian Institution, in the shape of facilities extended in connection with the study of specimens, as also for many valuable suggestions.

TURDIDÆ—Thrushes.

TURDUS Linnaeus.

T. migratorius propinquus Ridgw. Western Robin.

This variety of the common robin is found throughout this whole region as a summer visitant, and is more or less abundant according to special locality. In Nevada, the bulk of individuals arrive from the south in March, and spend the early spring in the low and sheltered valleys. As summer advances they make their way higher and higher up on the mountain sides, where they inhabit preferably the aspen groves. The species begins to lay in the neighborhood of Carson about the middle of May. A considerable number of pairs rear their first broods here and in other similar low valleys. But as soon as the young are on the wing all withdraw, apparently to the mountains, and by July, when the lowlands are dry and parched, the sight of a robin is extremely unusual.

Robins were fairly numerous in Oregon, along the Columbia River, during the last of October, and a few doubtless winter even at this high latitude.

T. naevius Gm. Varied Thrush; Oregon Thrush.

This fine thrush is chiefly known to us as it occurs during fall and winter at points far south of its summer home. Apparently its breeding range is wholly confined to the regions west of the Cascade, and perhaps the northern Sierra ranges, from a point somewhere about the Columbia River northward. Even in October I saw but a single individual at The Dalles, while a day's march down the Columbia toward the west slope of the Cascades brought me to where the species was very numerous.

From my friend Mr. H. G. Parker I have information of the occurrence of this thrush near Reno, in Western Nevada, just at the base of the Sierras, thus confirming its supposed presence here, as mentioned in a previous report (1877). Very large numbers made their appearance in this neighborhood about February 1, probably from the mountains to the westward, and remained till into March. Doubtless this is not an unusual event in the history of this species, and we may consider its winter habitat as including the main chain of the Sierras on either slope.

The four instances known of the occurrence of the varied thrush along the eastern coast must be looked upon as wholly exceptionable, especially as no cases are on record of its appearance even in the remoter western States to the east of the Sierras.

Habits.—As the result of my own observations I can add but few details respecting the habits of the varied thrush. In the fall it is not a bird of the open, but appears to pass most of the time in the dense evergreen woods, where it obtains from amongst the low shrubbery various kinds of berries, which evidently form its chief fare at this season. Under my observation it bore out its ascribed character of being a rather shy and suspicious bird, and it was only upon occasions that I succeeded in pushing my acquaintanceship to close quarters. While making my way along the innumerable old wood-roads and tangled bridle-paths that intersect the pineries in all directions—relics of the woodchopper and lumberman—unsuspected, I frequently came upon small flocks of these thrushes. The alarm-note is a single loud *chuck*, frequently repeated, and is very similar to that of the small olive-backed thrushes, but much louder. A very few moments upon such occasions sufficed to see the band dispersed in alarm, and each seeking a safe position towards the tops of the tall, thick firs and spruces, in which they invariably took shelter. Altogether there is much in the habits and notes of the species that is suggestive of the smaller members of the genus, and it certainly resembles them in more particulars than does the robin. Still its size, its gregarious disposition, and its partiality for berries, naturally cause it to be associated in thought with the robin.

I saw many nests in the crotches of the small firs and upon brushy saplings that, under casual notice, much resembled the usual structure of the robin, but some of which were probably constructed by the varied thrush. Not recalling to mind at the time how readily identifiable the nest of this species is—constructed without mud—I neglected to examine these structures critically. That more or less remain to breed in the dense forests along the Columbia seems in the highest degree probable, and, in fact, I was informed by lumbermen that both “robins” remained all summer.

T. pallasi auduboni (Baird). Audubon's Hermit Thrush:

During the past summer the important fact was ascertained that this form of the hermit thrush, instead of being strictly limited to the Rocky Mountains, as has hitherto been assumed, crosses the basin and breeds along the eastern slope of the Sierras. During the summer of 1877 I heard, in several of the subalpine valleys of Northeastern California, what were without doubt the Audubon's thrushes, but failed to secure specimens. Here they were evidently not very numerous; but in the mountains back of Camp Bidwell, the succeeding season, the same thrush was heard, and this time was satisfactorily identified by shooting the bird. They were here very abundant, and at this date, July 19, the pine woods were filled by the sweet music of the males.

T. pallasi guttatus Pall. Dwarf Hermit Thrush.

The dwarf thrush appears to occur along the eastern slope, as it does in the Rocky Mountains, only as a migrant, and as such perhaps only in the fall. By the last of August it was found numerous along the foot-hills of the Cascade Range of Oregon.

I consider it very probable that the southern breeding limit of this form will eventually be found to include the mountains of Oregon, upon their western slope; but we have no facts of observation to fully bear out such a conjecture.

MYIADESTINÆ—Fly-catching Thrushes.

MYIADESTES Swainson.

M. townsendi (Aud.). Townsend's Fly-catching Thrush.

This bird was found by our party to be very abundant in the Deschutes Basin in September, where, too, it was reported by Dr. Newberry in 1860. In fact, I have never seen the bird congregated in such numbers over so wide an area as here. In fall and winter it appears to be generally dispersed over much of the country adjoining the eastern slope, where in summer it appears to be almost entirely absent. During the summer of 1877 I saw but a single individual in the mountains of Eastern California, although the condition of this individual, a male, indicated that it was mated and breeding, so that it is to be presumed that the multitudes that throng here in fall localize themselves in some favorable section during the breeding period.

The localities affected by them in Oregon in fall are almost exactly similar to their range in New Mexico, Utah, &c., a fact which sufficiently establishes their natural predilections. It is as desolate a type of country as one can well imagine, being covered everywhere with volcanic *débris*, which is thrown up in the shape of low hills or scattered broadcast over the general expanse as though the unsightly blocks had rained down. Ravines with their rocky ridges scar and seam the country in every direction, while an almost total absence of vegetation, except in the shape of dwarf cedars or stunted piñons, renders such a region a desert indeed. Of such a nature is the country to the south and west of Prineville, Oregon, and here a day's march along the road revealed many hundreds of these fly-catching thrushes.

It is a curious fact in the history of this species that, in the fall, when the season of love, which is supposed to directly inspire the music of birds, has long since passed, and most other songsters are either entirely silent or their songs are limited to the first rude practicings of the young males, the Townsend's flycatcher should now—not at rare intervals, but as a regular habit—give utterance to snatches of melody that, though but a fraction of its splendid powers, may yet challenge the utmost efforts at emulation of most other species. And I am by no means sure that such musical rivalry as takes place at this time among the males does not owe its origin, in part at least, to the fading embers of a passion not yet fully spent. At all events, I have often seen, at this season, two males in eager pursuit of a companion—apparently some coy female—that led them an eager chase for five or ten minutes at a time, in a way that could suggest only the ardor of the mating season. The males engaged in such a chase are always full of song, which pours out as brilliant snatches and fragments of their fuller, more perfect symphonies of spring.

OROSCOPTES Baird.

O. montanus (Townsend). Sage-Thrasher.

Nowhere in the wide region inhabited by this thrush is it more abundant than on the sage-covered hills and plains of Western Nevada, just at the base of the mountains which shut off the western extension of the species.

In a climate like that of Nevada, where the transition period from spring to summer is never very well marked, and summer is at hand almost as soon as the snow disappears, there are always to be observed great irregularities in the time of nesting of the birds. This is as true of the smaller as of the larger species. Thus, taking the present bird as an example, the 20th of May appears to be just about the height of its breeding season. Although at this time not a few pairs were feeding full broods, yet the majority of the nests contained fresh eggs, while some dilatory couples had but just brought their homes to completion. There was thus to be noted a difference of fully six weeks between the earliest and latest periods of deposition of the first clutches of eggs.

As the eye passes over the sage plains of the far West it finds a broad, slightly undulatory expanse, covered everywhere with the characteristic sage-brush and presenting to the sight no breaks in its apparently smooth surface. In reality, however, the plains are very far from being level, and it needs but a short walk in any direction to reveal the presence of unsuspected little valleys and ravines, their boundaries traced on either side by more or less abrupt rocky ridges. It is along the crests and sides of just such ridges that the sage-thrasher is most at home, and in the vernal season, at intervals of every few hundred yards, the males may be heard pouring out at all times of day their delightfully melodious strains. In the presence of its humble associates, the Bell's finch and Brewer's sparrow, which alone share its desolate surroundings, our thrush finds no rivalry to stimulate its efforts; but, unmindful of this, it sings on, finding, perhaps, its reward in the satisfaction born of its own powers or the delight its strains carry to the heart of its silent brooding mate. Its song, though not possessed of great variety, is noteworthy for its sweetness and expression.

The nests, of which I have examined very many, vary but little either in composition or situation. Solidity and bulkiness sum up their chief characteristics. The foundation is of sticks and twigs, the thorny character of which enables them to be firmly interlocked, so as to form a strong support capable of resisting all ordinary accidents, and even to defy wind and weather for many successive seasons. I do not think, however, they are ever utilized a second time. The inner or nest proper is made of rootlets, with perhaps a few horse-hairs, which are woven into a circular depressed cup.

Numerous sets of eggs compared together show but little variation, and this chiefly in the amount and method of distribution of the spotting rather than in the colors themselves.

SAXICOLIDÆ—Stone Chats.

SIALIA Swainson.

S. mexicana Sw. Mexican Bluebird; Chestnut-back Bluebird.

This is the common bluebird of the region. During the summer it inhabits not only the low valleys, but, to even a greater extent, the mountains, being there found in the dense pine timber up to about 6,000 feet. As is the usual custom of the Eastern species, the present bird, as indeed also the Arctic, raises two broods during the summer, and the season is far advanced ere family duties cease.

S. arctica Sw. Arctic Bluebird.

The habitat of the present bird is, in general, more northern than that of the preceding. Nevertheless, the two species are not infrequently marked in local lists as inhabiting

the same districts at the same season. When such is the case, the present species is usually found at higher altitudes in the mountains, whence it descends in fall and winter to the same neighborhood where the chestnut-back bluebird makes its summer home. Their connection is hence not so intimate as might naturally be inferred.

The statement of a more northerly habitat for the Arctic bluebird is true only in part; since, while it attains higher latitudes and, coincident with this, seeks out higher elevations in the mountains, it yet was found breeding by our parties as far south as Santa Fé, and here, too, entirely outside of the mountains. This probably represents about its southern breeding limit, while, on the other hand, *mexicana* does not reach much farther south.

A nest of *arctica*, probably the second of the season, was found July 31 in a dead pine stub. It contained five eggs, far advanced.

CINCLIDÆ—Water Ouzels.

CINCLUS Swainson.

C. mexicanus Sw. American Dipper.

Common upon many of the streams of the eastern slope, where noted as high up as the Columbia River.

Concerning the habits of this interesting species, I have no new facts to add to the extended notices which have appeared elsewhere, more particularly as they seem to be everywhere about the same. In reading Maegillivray's excellent account of the European dipper and its mode of life, I notice a statement to the effect that the dipper is by no means an adept at walking on land; he says, after denying its alleged absurd habit of walking in the water on the bottom: "Even on land I have never seen it move more than a few steps, which it accomplished by a kind of leaping motion. Its short legs and curved claws are very ill-adapted for running." * * * Such being the case, it would appear as though there is, in this particular, a very marked difference between the European bird and our own; for no one who has made the acquaintance of our dipper in its native haunts would hesitate for a moment to affirm that it is both agile and graceful in its movements on land, if grace be understood to mean an easy and assured manner. Possessed apparently of equal powers for progression under water with its European ally, our species by no means depends wholly, or at times even in great part, upon these for its subsistence; but, on the contrary, may often be seen for an hour at a time wading in the shallows, or running quickly over the wet rocks or along the pebbly shores in search of food, when its activity and nimbleness of movement are very apparent. In fact, its amphibious nature would appear at times to be almost forgotten, or to be called to its aid only for very brief intervals; while, again, it appears on land, only to disappear a moment later in the swiftly moving current.

SYLVIIDÆ—True Warblers.

REGULUS Cuvier.

R. calendula L. Ruby-crowned Kinglet.

A common summer inhabitant of the pineries. Its songs, loud, clear, and harmonious, were heard all day long issuing from the tall, thickly-foliaged firs and spruces, in which, without doubt, the nests were secreted.

CERTHIIDÆ—Creepers.

CERTHIA Linnæus.

C. familiaris L. Brown Creeper.

A common summer inhabitant of the coniferous belt all along the eastern slope.

TROGLODYTIDÆ—Wrens.

SALPINCTES Cabanis.

S. obsoletus Say. Rock Wren.

A common summer visitant throughout this whole region. Its love for rocky fastnesses is well typified in its name. Its nest is often placed beneath the shelter of a rock, or, as I have on several occasions seen it, in some slight recess or natural cavity in a sand-bank; in fact, any hidden nook or natural recess that promises concealment is available for its purpose. A nest found on the 15th of May contained eight eggs,

the young in which were just ready to chip the shell. The rock wren is thus among the very first of the small birds to lay. The eggs vary so little as to be easily characteristic of the species; ground-color pure white, with a rather even distribution over the entire surface of minute, roundish, reddish-brown spots.

TROGLODYTES Vieillot.

T. adon parkmanni Aud. Western House Wren.

Numerous as a summer resident all along the eastern slope. As a rule, keeps in the timber of the uncivilized districts, and seems rather loth to accept the accommodations offered in the towns, where, however, it is occasionally seen.

T. hyemalis pacificus Bd. Western Winter Wren.

This bird was not met with until the Columbia River was reached; here in October it was found to be very abundant, more so, in fact, than I have ever known the winter wren to be elsewhere. Nearly every brush-heap contained at least one of these sputtering, scolding mites, while not rarely several were heard or seen in the space of a few yards. It was found on both slopes of the Cascades, although it was not nearly so numerous upon the east side of the mountains as upon the west. As fall advances, it finds its way farther south, and reaches on both slopes as low as the latitude of San Francisco. I am inclined to believe that it breeds all through the pine woods of the mountains near the Columbia. It winters here, as also, according to Cooper, in Washington Territory.

CISTOTHORUS Baird.

C. palustris Wils. Long-billed Marsh Wren
Extremely abundant in all the tule marshes.

PARIDÆ—Titmice.

LOPHOPHANES Kaup.

L. inornatus (Gamb.). Plain Titmouse.

This species is present in Nevada in the foot-hills of the mountains and on the low ranges to the east of the main chain. It was not met with in the Columbia River region, nor even in Northern California.

PARUS Linnæus.

P. rufescens Towns. Chestnut-back Chickadee.

According to Dr. Cooper, this species is the most abundant of the family in Washington Territory, where, however, it is probably limited for the most part or entirely to the districts west of the mountains. Such, at least, appears to be the case in Oregon, where the species did not fall under my observation until at the Cascades on the western slope, where I saw a single small flock in October. It is probably a summer resident here, and perhaps even farther south in Northern California. In fall it migrates to below San Francisco, but does not appear upon the eastern side of the chain.

P. montanus Gamb. Mountain Chickadee.

Breeds numerously among the pines. Extremely abundant among the oaks of the eastern slope, near the Columbia River.

PSALTRIPARUS Bonaparte.

P. plumbeus Bd. Plumbeous Titmouse.

This chickadee, which is peculiar to the middle province, extends its range clear to the foot-hills of the Sierras, but does not enter the mountains. Thus, among the barren piñon hills near Carson City, I saw, in July, a flock of twenty or thirty individuals.

SITTIDÆ—Nuthatches.

SITTA Linnæus.

S. canadensis L. Red-bellied Nuthatch.

This species appears so much oftener in the local lists of the Eastern States than of the Western that many ornithologists have come to regard it as a quite typically east

ern species. Nevertheless, in the extreme parts of the West, as upon both sides of the Sierras, from the line of the railroad to the Columbia River, and so on to the north, the red-bellied nuthatch is really a common bird, and in much of this area it doubtless breeds. It appears to be the presence of a country suitably timbered to meet its wants—pine-lover as this species pre-eminently is—more than aught else that determines its presence or absence. In addition, its distribution is clearly governed by its preference for a cool climate, such as it finds in the north or in the high Sierra Nevada.

Towards the Columbia River it was observed to become more numerous, and upon the upper Deschutes its numbers, in certain localities, were comparable with those of the pigmy nuthatch.

S. carolinensis aculeata (Cass). Slender-billed Nuthatch.

A numerous and constant resident among the conifers; not so common towards the Columbia River as either of the other species.

S. pygmaea Vig. Pigmy Nuthatch.

The most numerous of the family in the Sierra Nevada and Cascade Mountains, as almost everywhere through the West.

SYLVICOLIDÆ—American Warblers.

HELMINTHOPHAGA Cabanis.

H. celata lutescens Ridgw. Western Orange-crowned Warbler.

Moderately common in summer when inhabiting the mountain slopes, but most numerous during the fall migration.

DENDRECA Gray.

D. aestiva (Gm.). Yellow Warbler.

Numerous as a summer resident in the shrubbery of the streams, which the species follows up to an elevation among the mountains of at least 8,000 feet. It penetrates beyond the Columbia and into Washington Territory.

D. townsendi Nutt. Townsend's Warbler.

This bird, which I had hoped, though scarcely expected, to find a common resident of the coniferous belt of the Cascades in Oregon, was met with but twice, in September. In each instance the individual was migrating in company with flocks of Audubon's warblers and other birds.

In full plumage the Townsend's warbler is one of the most beautiful of the family, as it has been until a comparative recent period one of the rarest. Since it was found by the expedition of 1874 to be a common migrant in the mountains of Southeastern Arizona, numerous specimens have been received by the Smithsonian Institution from California, notably from near Sacramento, where obtained by Mr. L. Belding. This warbler appears to be only a casual migrant along the line of the eastern slope, and, in three seasons' collecting, the two mentioned above represent all I have seen. On the Pacific side, however, it is comparatively numerous, both in spring and fall. As to its breeding range, I can find no evidence on record that warrants the statement that the species finds a summer home within our territory. Still it would not be surprising were it eventually found to summer in Oregon, in the dense pine-belt to the west of the Cascade Mountains. If such is ascertained to be the case, this, at least, is likely to prove its extreme southern limit. The fact that the statements of its occurrence in the United States have always been accompanied by the term "migrant," affords pretty conclusive proof that as a species it summers in the far north.

Such migrants as are found in the Rocky Mountains in fall, at which season they alone, have been noted, are to be reasonably accounted for as having followed this path from the extreme northern points of that range, where it approaches the Pacific.

D. auduboni (Towns.). Audubon's Warbler.

Common as a summer resident among the conifers at high elevations; most numerous during the migrations, being, in fact, the chief representative numerically of the *Sylvicolidae* along the eastern slope.

GEOTHLYPIS Cabanis.

G. trichas L. Maryland Yellow-throat.

By no means uncommon in Western Nevada, in situations similar to those frequented by the species in the East. A nest found at Washoe Lake, Nevada, May 23, contained four eggs far advanced toward hatching.

G. macgillivrayi Bd. Maegillivray's Warbler.

Fairly numerous in summer along the eastern slope. I find no reference to the species in my note-book as occurring farther north than Northern California. As, however, according to Cooper and Suckley, it reaches to Puget Sound along the coast, it is safe to infer that on the eastern slope it passes the Columbia River into Washington Territory.

A nest found July 24 contained four young a few days old.

ICTERIA Vieillot.

I. virens longicauda (Lawr.). Western Yellow-breasted Chat.

A rather common summer visitant about Carson, Nev., but becoming less so to the northward, until, in extreme Northern California, it is quite rare.

MYIODIOCTES Audubon.

M. pusillus (Wils.). Wilson's Black Cap.

As a summer resident of the eastern slope the species appears to be rare; it may, however, be more common at this season towards the Columbia River than farther south.

June 24 I saw a female of this species in an alpine valley of Northern California, at an elevation of about 6,000 feet. Her excitement at my presence convinced me that her nest was near by; but circumstances not favoring a long search, I failed to discover it. In fall the species is comparatively common.

TANAGRIDÆ—Tanagers.

PYRANGA Vieillot.

P. ludoviciana Wils. Crimson-headed Tanager.

A common summer resident of the eastern slope as far to the north at least as the Columbia River, and without doubt reaching into Washington Territory.

HIRUNDINIDÆ—Swallows.

HIRUNDO Linnæus.

H. erythrogastra Bodd. Barn Swallow.

A numerous summer resident of the lowlands.

TACHYCINETA Cabanis.

T. bicolor (V.). White-bellied Swallow.

This is a more or less abundant inhabitant of the eastern slope, according to circumstances. It was not met with farther north than Northern California. Here in the mountains near Camp Bidwell it was numerous enough the last of July, at which time the pairs all had young, as was shown by their frequent visits to woodpeckers' holes in the aspens.

T. thalassina (Sw.). Violet-green Swallow.

This is an extremely abundant summer visitant in certain portions of Eastern California and Western Nevada, as, for instance, at Pyramid Lake. The pyramid-like cliffs which give name to this body of water form the abode of thousands of these beautiful swallows, which resort to the niches and holes in the faces of the rock for nesting sites.

In the mountains, where it is also abundant, it selects for this purpose the deserted holes of woodpeckers, giving everywhere marked preference to those in oaks. It is almost always found in close proximity to water.

A nest found July 1 contained five young and two unfertile eggs.

PETROCHELIDON Cabanis.

P. lunifrons (Say). Cliff Swallow.

By far the most abundant and generally distributed of the family.

COTYLE Boie.

C. riparia. Bank Swallow.

Present in Nevada and Eastern California, but apparently less numerous than the following.

STELGIDOPTERYX Baird.

S. serripennis (Aud.). Rough-winged Swallow.

According to Cooper and Suckley, this swallow occurs as far to the north on the coast as Puget Sound; certainly present along much of the eastern slope, and doubtless extending into Washington Territory along this line.

PROGNE Boie.

P. subis (L.). Purple Martin.

Colonies encountered at numerous localities among the pine woods of the mountains, where they are quite local.

VIREONIDÆ—Greenlets.

VIREO Vieillot.

V. gilvus swainsoni Bd. Western Warbling Vireo.

This vireo was found to be present along the eastern slope as far north as Southern Oregon, and, as I have never seen it more abundant than it was in Northern California, I have no doubt that it reaches to the Columbia along this line, or even into Washington Territory, as it does, according to Cooper and Suckley, along the Pacific side.

Very little can be said of its habits here that would not be a repetition of published accounts of the Eastern warbling vireo. It is merely that bird transferred from its usual surroundings to the wild mountain districts of the west. In the mountains near Camp Bidwell, the locality alluded to above, where the species was so numerous, I found many nests, three or four being often met with during a morning's collecting. They were without exception built upon small aspen trees, from three to five feet above the ground. With a lining of fine grasses, they were composed mainly of long strips of white fibrous bark, festooned externally with spiders' webs, bits of cottony substances from plants, &c. At this date, July 20-30, the eggs were so far advanced as to render their preservation very difficult.

Vireo solitarius cassini Xantus. Cassin's Vireo.

Few birds have given rise to more perplexing doubt and uncertainty respecting their relationships than the Cassin's vireo. Founded by Xantus in 1859, upon a fall specimen from Fort Tejon, its subsequent written history has been full of vicissitudes; for while by some authors it has been accepted as a valid species, by others it has been affiliated with *solitarius* as a variety; or, again, has been rejected altogether, and thrown into the list of synonyms of the latter bird.

From the time I made the acquaintance of this vireo in the southern Rocky Mountains it has had a peculiar interest for me, more especially, perhaps, from the fact that while then, and upon the many subsequent occasions I have met with it, I have had not the slightest difficulty in properly identifying the recently killed specimens or even the live birds; yet, in the closet and upon comparison with other specimens from the West marked as *solitarius*, I have found it extremely difficult to draw a line between the two; in fact, until the present time I have never been able to arrive at any satisfactory conclusion respecting the true rank of *cassini* and its kinship to *solitarius*. I am now fully persuaded, and trust to be able to show, that *cassini* is at the least something more than a special plumage of *solitarius*, which was the opinion expressed by Professor Baird in his Review of North American Birds, when, it is to be remembered, the type-specimen represented all that was known of the supposed species, the absence of material for comparison doubtless having much to do in shaping this view. Since then there have accumulated in the Smithsonian, as the result of the collections of this expedition and from other sources, twelve or more specimens that are either like the original type of *cassini*, or so near it that their identity with it is beyond suspicion. It is perfectly safe to say that, whatever it is, they are.

With little or no difference in size from Eastern *solitarius*, the type—and it is to be remarked that certain of the recently obtained specimens not only share its peculiarities but even exhibit them to a greater degree—offers only differences of coloration. These may be briefly summed up as follows: Typical examples of *cassini* are very much duller than the corresponding plumages of *solitarius*. The head above and on the side, instead of being of a decided blue or bluish ash, presents little or absolutely no contrast to the olive-brown (instead of olive-green) of the dorsum. The lores and

orbital ring, instead of being pure white, are of a dull white, strongly inclining to fulvous. The green of the sides is much mixed with or replaced by brown; the under parts generally are of an impure white, the result of a general admixture of brown. In fact, extreme examples of *cassini* are colored so much like *huttoni* that upon a color basis alone it would be difficult to distinguish them.

There are a sufficient number of specimens at hand showing the above characters to prove beyond a doubt that *cassini* is entitled to rank of some kind; in other words, that it is not a mere accidental plumage of *solitarius*. For be it noted, as stated by Professor Baird of the type, that *solitarius* as it is colored in the East never approaches the above. The color peculiarities of *cassini* are to be regarded then as entirely beyond and independent of individual variation. But, to complicate matters, nearly every author who has had occasion to treat of Western birds has noticed specimens, evidently not typical *cassini*, which he has referred with more or less doubt to *solitarius*. Thus, specimens of so-called *solitarius* are before us from Washington Territory, Oregon, California, Nevada, Utah, Wyoming, Arizona, &c. Some of these are certainly very close to *solitarius*, and I have always presumed the occurrence of that species in the West to be a matter that admitted of no doubt. But a recent careful examination of all these specimens shows not one that can fairly be called typical of that bird. In such specimens the back is of a varying shade of green; the head is more or less ashy in contrast, while the under parts are of a purer white than is the case with typical *cassini*. It is to be remarked, however, that not only is it scarcely possible to find two of these doubtful specimens that agree with each other, but by means of them a series can be formed that appears to grade directly from the typical *cassini* towards and almost, if not quite, into *solitarius*. The percentage of specimens of which the statement holds good that they are more like *solitarius* than *cassini* is quite small. Nearly all the intermediate specimens are really identifiable with *cassini*; in fact, of twenty-nine specimens in the collection which have been labeled indifferently *cassini* and *solitarius*, I find that twenty are referable to *cassini*, and cannot by any means be identified with *solitarius*. Of the remaining nine, three are so nearly intermediate that they might with about equal propriety be assigned to either, leaving six with a decided leaning toward *solitarius*. It needs, however, but an instant's comparison of these with the ordinary Eastern *solitarius* to show that although closely resembling that species, it would be going too far to say that they are typically the same. In connection with the rest of the series they are clearly intermediate, but on the *solitarius* side of the line.

The testimony of the series as a whole seems to show pretty conclusively that the solitary vireo proper does not occur in the West, and that all specimens which have been so identified are either *cassini* or are intermediate between the two; the latter class, in fact, furnishing the evidence that the two inter-grade, and hence that *cassini* is a variety of *solitarius*.

The only alternative would be to throw *cassini* out entirely and refer all Western specimens to *solitarius*. But, in our judgment, typical specimens of *cassini* are now too numerous and show too decided and constant differences to warrant such a procedure.

The habitat of Cassin's vireo may receive a moment's attention. Its summer home appears to be strictly limited to either slope of the Sierra Nevadas, from Washington Territory to Southern California. I can find no specimens (including under the head of *cassini* all individuals hitherto supposed to be *solitarius*) from the Rocky Mountains in spring or summer.*

As a migrant in fall the occurrence of the Cassin's vireo in the latter range is not surprising, or no more so than that of several other Sierra Nevada birds, as *Juco hyemalis*, *Turdus pallasi nanus*, *Dendroica townsendi*, and *occidentalis*, &c.

I have alluded in a foot-note below to a specimen, the coloration of which is intermediate between *solitarius* and *plumbeus*. Such specimens do not appear to be as common as in the instance of the Cassin's vireo, but I have seen too many such to render the relationship of the two former birds at all doubtful in my own mind. With its notable increase of stature, and the laying off of nearly all the bright tints that distinguish *solitarius*, *plumbeus* might well pass for a different species, but for the fact that specimens of unquestionable intermediate character have been repeatedly taken; so that consistency would seem to demand that its near relationship to *solitarius* should be formally as well as tacitly admitted. Although this race possesses an average size considerably in excess of *solitarius*, the latter occasionally leads well up to its smaller individuals. *Turdus pallasi*, with its race *auduboni*, furnishes precisely the same phenomenon of increase of size coincident with a mountain habitat.

Of the two Western varieties of the solitary vireo, *plumbeus* appears to be the best marked. This is not because typical examples of it are any more readily recognizable than of *cassini*, but because intermediate specimens of the former appear to be less com-

* A specimen, No. 11,064 of Nat. Mus. Res., taken at Fort Bridger in May by Drexler, was labeled *solitarius* and so referred to by authors. This I ascertain upon examination to be the plumbeous vireo (*V. solitarius plumbeus*). Its colors are those of *plumbeus*, with the addition of a slight admixture of green, it being in fact intermediate between that form and *solitarius*.

mon; in other words, *plumbeus* appears to be further advanced in the process of differentiation, and hence to be more constant to its type. Too much stress should not, however, be laid upon this apparent fact, since the locality of specimens of this race appears to be an important factor. Thus, all specimens of the plumbeus vireo that we have seen from the neighborhood of Fort Whipple, Arizona, the region whence described by Dr. Coues, are extremely typical; but from points farther north, as Forts Laramie, Bridger, and thereabouts, nearly all—perhaps all—are to a varying extent intermediate.

Similarly, the eastern slopes of the Sierras and Cascades appear to furnish, in summer at least, nothing but typical *cassini*, while from the Calaveras Grove California, and other localities on the western side of the mountains, we have both typical and intermediate specimens, both styles breeding. As bearing on the subject, I may recall the fact that many of the shrikes from the same localities are scarcely distinguishable from specimens from Florida (*ludovicianus*).

To sum up, the solitary vireo, like many other birds, appears to be divisible in three distinct races, according as it inhabits the eastern, the middle, or the Pacific provinces. Each has its own restricted summer habitat, where it alone is found. In fall the two Western mingle, to some extent, during the general dispersion attendant upon the fall migration.

The following figures indicate the size of each of the three forms:

Solitarius.—Average of 11 specimens: Wing, 2.92; tail, 2.23; bill, .40; tarsus, .71; largest individual, 3.06, 2.35, .38, .72; smallest individual, 2.80, 2.15, .40, .73.

var. plumbeus.—Average of 17 specimens: Wing, 3.14; tail, 2.40; bill, .43; tarsus, .74; largest individual, 3.22, 2.45, .43, .77; smallest individual, 3.03, 2.25, .43, .74.

var. Cassini.—Average of 28 specimens: Wing, 2.82; tail, 2.23; bill, .41; tarsus, .73; largest individual, 2.93, 2.27, .42, .67; smallest individual, 2.70, 2.01, .43, .73.

LANIIDÆ—Shrikes.

LANIUS Linnæus.

L. ludovicianus excubitorides (Sw.). White-rump Shrike.

Most numerous in summer, when it lives chiefly in the lower foot-hills among the sage-brush. Some appear to remain all winter in the latitude of Carson.

The northern shrike (*C. borealis*) also appears here in fall.

TANAGRIDÆ—Tanagers.

PYRANGA Vieillot.

P. ludoviciana (Wils.). Louisiana Tanager.

A summer visitor of the mountains, as high up at least as the Columbia River.

A nest found June 26, near Susanville, Cal., contained three young and two eggs, the latter just on the verge of hatching. The nest was a loose structure of root-lets, similar to the usual style of the *P. rubra*, and was placed on the extremity of a limb of a cottonwood, about fifteen feet from the ground.

As a rule, our tanagers lay but three eggs, and five must, I think, be a rather unusual complement.

FRINGILLIDÆ—Sparrows, Finches.

LOXIA Brisson.

L. curvirostra americana, Wils.

This crossbill becomes numerous in the mountains and on the foot-hills in fall. It is presumably a resident in Oregon, although I cannot find any direct evidence to this effect.

CARPODACUS Kaup.

C. purpureus californicus (Bd.) Californian Purple Finch.

A single individual of this species was taken at The Dalles on the Columbia in October from a flock of pine finches. This is the first record of its occurrence at any point along the eastern slope, its distribution being to the west of the mountains from as far north as the Straits of De Fuca (Cooper) to below San Francisco.

C. cassini Bd. Cassin's Purple Finch.

An abundant summer inhabitant in the neighborhood of Carson, and, although, perhaps becoming rather less numerous as northern California is reached, the species

persists to the Columbia River. This, I believe, gives it a more northern extension than has hitherto been supposed. In summer they are quite local, and crowd into a certain neighborhood of a section to the total disregard of others which, perhaps, appear no less suited to their economy. I found communities of considerable size thus colonized in certain parts of the pine woods about Eagle Lake, California, and elsewhere. In common with others of their kin they are delightful singers, and the burst of melody which greets the ear of the chance passer by as he happens upon one of these musical oases in the generally silent forests is no less pleasing than it is unexpected. Like the common goldfinch (*C. tristis*) the males have the habit of singing in chorus, and it takes very little imagination to construe their efforts into rival contests. Whether they possess such significance to the birds themselves or not, it is certain that each individual appears to sing his loudest and best, as though trying to drown the notes of his neighbor, or, perhaps, too well pleased with his own efforts to care for aught else. The effect, as the medley of delightful strains goes ringing through the leafy arches of the pineries, is pleasing in the extreme.

The nests, of which I have seen many, were all placed on large pines and well out toward the ends of the lower limbs.

By the latter part of June nearly all the pairs were feeding young, and none of the nests that were accessible contained eggs.

C. frontalis (Say). House Finch.

An abundant species wherever found. It was not observed much farther north than Honey Lake, Northern California.

CHRYSOMITRIS Boie.

C. tristis (L.). Common Goldfinch.

A common summer resident at many points. Found on the Columbia River in October.

C. pinus (Wils.). Pine Finch.

This species occurs along the whole eastern slope in fall and winter, and passes the summer in the coniferous belt in much of its extent. In Oregon, from August on, wherever I penetrated the mountains, I was almost sure to run across flocks of these finches, whose twittering notes often betrayed their presence in the tops of the tall pines and spruces when the birds themselves were only visible upon patient scrutiny.

PASSERCULUS Bonaparte.

P. savanna alaudinus Bp. Western Savanna Sparrow.

Numerous in all wet meadowy lands, and as much so in Oregon as farther south.

A nest taken near Washoe Lake, Nev., May 22, contained four fresh eggs. These are rather peculiar both in shape and in markings, although the differences probably represent nothing but individual variation and are not distinctive of this western race. They are of a greenish-white ground color, heavily blotched in a more or less confluent ring at the larger ends with burnt sienna and various shades of lavender. They are short and rounded in shape, measuring $(63 \times 55)^2$, 66×54 , 65×53 .

P. savanna sandvicensis (Gm.). Sandwich Sparrow.

The preceding form is the type that prevails in summer all along the eastern slope. In fact at only one locality did I detect the presence of the present bird, viz, on Crooked River, Oregon, in September.

A sandy pasture at this point proved favorite ground for the savanna sparrows, and a walk through the weed patches usually resulted in starting up scores. Among the rabble I noticed one day an individual of apparently larger size than the rest, and upon shooting discovered it to be of the present race. Further search resulted in the acquisition of one additional specimen. So far as known *sandvicensis* is a strictly coast form; but its presence here is, after all, by no means remarkable, since in the fall migration a few might readily find their way up the Columbia River and so move south along the eastern slope. As I did not find it elsewhere, I judge it to be rare.

POECETES Baird.

P. gramineus confinis Bd. Western Grass Finch.

Numerous in the valleys. Noted no farther north than Southern Oregon, but, without doubt, extending into Washington Territory.

CHONDESTES Swainson.

C. grammaca (Say). Lark Sparrow.

This species was lost sight of about one hundred miles north of Carson. It doubtless occurs in the low valleys, quite up into Oregon; in fact, Suckley records a single specimen from The Dalles, on the Columbia.

ZONOTRICHIA Swainson.

Z. albicollis (Gm.). White-throated Sparrow.

Dakota has hitherto been given as forming the western limit of this sparrow. Nevertheless, it seems probable that it is to be added to the list of eastern species that reach the Pacific on the northwest coast and summer at the point where the Rocky Mountains dwindle away and admit of free passage. At all events, the presence of the white-throated sparrow was detected on the Columbia River, about forty miles from The Dalles, and thus beyond the eastern slope, and one of the two individuals seen was captured. I presume that it is by no means scarce here, although as the individuals noticed were seen only an hour or so before camp was broken for the return up the river, no opportunity was had for a satisfactory investigation of the matter.

Z. leucophrys (Forst.). White-crowned Sparrow.

As almost everywhere throughout the West, this sparrow occurs along the eastern slope in great numbers during the migrations. It is also numerous in these mountains in summer, resorting to breed to the willow thickets and aspen groves along the streams.

A nest found in Eastern California, June 20, contained four eggs but slightly advanced. Several found on the 24th held young. The nests were quite typical of the ground-building sparrows, being outwardly composed of weed-stalks with an interior lining of fine grasses and horse hairs, the whole snugly hidden away with a sparrow's cunning beneath a small bush.

The eggs are of a faint bluish green, irregularly and profusely spotted with reddish brown, which is most conspicuous at the larger ends.

Z. gambeli intermedia Ridgw. Ridgway's Sparrow.

Flocks composed of this and the previous bird frequently fall into the path of the collector in this region during spring and fall. The present bird was not found in the mountains as a summer resident, and I believe it goes farther north to breed. Mr. Ridgway, indeed, in his recent report to King,* mentions this bird as nesting in numbers at Donner Lake Pass in the Sierras; but, as I now learn, he believes that his identification was incorrect (circumstances not permitting specimens to be obtained), and that the species thus referred to was, beyond doubt, the *Z. leucophrys*. This agrees fully with my own experience in this region, and leaves us with no record of the breeding of the *var. intermedia* in the Sierras.

I have elsewhere presented facts bearing upon certain differences in the migrations of these two *Zonotrichias*, and have referred to the very extensive overlapping, eastward and westward, of their respective habits, urging that these considerations, coupled with the constant, albeit slight, differences in coloration between the two, were sufficient to warrant the conclusion that *intermedia* was not a race of *leucophrys*. I am more than ever convinced of the truth of this. The *Z. leucophrys* is now known to breed on the northern frontier from the Atlantic to the Rocky mountains, and thence to the summit of the Sierras, and to follow the trend of these ranges far to the southward. Over all this immense region it maintains its characters with perfect consistency, there appearing in fact to be no appreciable differences between specimens taken on the Atlantic and others from its most remote western point. So far, then, as geographical considerations offer any evidence, it is manifestly absurd to consider *intermedia* as the "western" representative of a bird that in its typical condition is found in nearly every portion of the West, and that, too, breeding.

On the other hand, that the relations of *gambeli* and *intermedia* are those of species and variety seems perfectly certain, and the two may be so treated in perfect conformity with well ascertained laws of geographic variation, *gambeli* being the darker coast representative of the pale, more northern (?) interior form *intermedia*.

Z. coronata (Pall.). Golden-crowned Sparrow.

This sparrow occurs along the eastern slope during the fall migration, but by no means in such immense numbers as distinguish its presence to the westward. On the

*Ornithology of United States Geological Exploration of the Fortieth Parallel, Clarence King, in charge, p. 471.

contrary, its numbers are limited to the comparatively few that find their way into the bands of white-crowned and Ridgway's sparrows, and with them perform the journey southward, or winter in favorable localities. Suckley, however, speaks of the Golden-crowned Sparrow as an abundant summer resident about The Dalles.

JUNCO Wagler.

J. oregonus (Townsend). Oregon Snowbird.

This snowbird appears to pass the summer among the mountains, from about the latitude of Carson, Nev., northward, and is the only one of the genus that inhabits the Pacific province.

A nest found June 23 contained young. It was placed on a hillside in a little patch of an evergreen shrub that raised above the earth sufficiently to screen the nest, the top of which was sunk on a level with the ground. This may have been an unusually late brood, for I had taken fully fledged young some few days earlier.

A second nest, found August 2, held three young, several days old.

I subjoin a description of the young in the first or nest plumage, remarking that in this condition the young of all our snowbirds resemble each other very closely, those of several of the forms, in fact, being distinguishable only with great difficulty.

First plumage: Prevailing tint above rufous, the feathers streaked medially with black; wings and tail blackish-brown, each feather edged with rufous. Throat, breast, and sides profusely spotted with black; belly of a fulvous white; sides washed with rufous; first outer tail-feather always, usually the second, sometimes the third, white.

AMPHISPIZA Coues.

A. belli nevadensis (Ridgway). Artemisia Sparrow.

This sparrow breeds abundantly among the artemisia wherever it grows, and even follows it to a considerable altitude in the mountains, although the sage plains, at their lower levels, appear to be the proper home of the bird. The species occurs less abundantly in Northern California than to the southward.

In the vicinity of Carson, where I found several nests, its eggs are laid about May 15. As nesting sites sage bushes were invariably selected. Dried weed-stalks make up the bulk of the structure, with an interior of the soft, fibrous sage bark, inside which is the lining proper, of sheep's wool, which is readily obtained by the birds almost anywhere in this country.

The eggs vary much in the exact character of their markings, as also, to some extent, in size. With a faint greenish-white background, they are spotted, much less heavily at the smaller than at the larger end, where the markings are often accumulated into a circle, with various shades of brown inclining toward sienna, with lavender, and faint purple. The sienna is often laid on in the shape of scratches or blotches, so densely as to appear almost black. Altogether the appearance of the eggs of this species is peculiar.

Two sets measure as follows: $(79 \times 58)^2$ 83×58 75×58 ; $(76 \times 58)^2$ 77×57 78×57 .

SPIZELLA Bonaparte.

S. monticola (Gmelin). Tree Sparrow.

A flock of tree sparrows was seen upon the Columbia in October, but, owing to a failure to interest my mule in the matter, no specimens were actually secured.

Dr. Cooper leaves a note to the effect that he saw what he took to be tree sparrows in the Sierras, and Suckley obtained a bird at The Dalles in winter which he identified, per book, as of this species. So the tree sparrow may be presumed to be a fall migrant and winter resident of this region on both slopes of the Sierras; but it is probably less common than farther east.

S. socialis arizonæ Coues. Western Chipping Sparrow.

A common summer inhabitant of the eastern slope. It is found in Washington Territory, west of the mountains, and doubtless to the east, although it was not met with about the Columbia, perhaps owing to the lateness of the season.

S. breweri, Cass. Brewer's Sparrows.

This quaint little sparrow is almost as characteristic an inhabitant of the sage-brush plains as the Bell's finch. Together with the latter bird and an occasional sage thrush this species makes up the usual avian life of these forbidding wastes and, in numbers at least, the Brewer's sparrow is the most conspicuous of the three. Living often far distant from water, and with no hint of the usual attractive surroundings

that we come to consider as being necessary to the happiness if not the very existence of bird life, our little sparrow appears to be perfectly contented with its lot and unmistakably expresses himself so in the unobtrusive but pleasant little songs he sends forth at odd times during the entire day.

In what appears to be somewhat exceptional instances, this sparrow varies its habitat to a considerable extent. Thus I have occasionally found the summits of the high peaks to be occupied, together with a few other species, by the Brewer's sparrow. The low brush or "scrub" into which the luxuriant sub-alpine vegetation dwindles, as the higher altitudes on the mountains are reached, seem to offer conditions sufficiently similar to its more usual haunts to meet all requisites. In such spots the Brewer's sparrows were often very numerous, while the presence of young birds sufficiently attested the fact that here was their summer abode.

The nests of this sparrow are very much like the usual structures of the "chippy," but appear to be invariably placed in a low bush. Much variation appears in the shape as well as the markings of the eggs. The latter usually occur as blackish spots and blotches; these are generally few in number, and are mostly at the larger end, leaving the greenish-blue ground unoccupied for its greater part. Some specimens show no traces of black, but the spotting assumes a reddish-brown or neutral tint, often confluent in a ring at the larger end. Other sets have only a faint irregular freckling of the same. The smaller eggs exhibit a more or less decided pyriform shape, while those of larger size vary in the direction of a more elongated oval. The following measurements express these variations in size: $(67 \times 48)^2$, 68×47 ; $(63 \times 48)^2$, $(62 \times 47)^2$; 69×50 , 68×52 , 65×50 , 69×53 .

MELOSPIZA Baird.

A study of the song sparrows of the United States and adjoining regions reveals an extraordinary amount of variation, coinciding more or less closely with definable geographical areas. Others of our species are possessed of a similar wide range, but in no other are exhibited such marked variations of color and such mutations in size as in this.

The song sparrow, although apparently nowhere a permanent resident, in the strict meaning of that term, that is, to the extent of the same individuals remaining in the same place throughout the year, is yet migratory to only a limited degree; and it is probable that the change of locality with the migrations is, in the instance of none of the forms, very marked. It is doubtless to this localization and the resulting constantly-exerted influence of the same circumstances of environment, that we are to attribute the extraordinary tendency in this bird to develop into races and offshoots, according as its range brings it under differing conditions. As Dr. Coues happily phrases it, "Migration holds species true; localization lets them slip." And nowhere is to be found a better illustration of this aphorism than is presented by the song sparrow.

A recent examination of the extremely large collection of song sparrows in the Smithsonian Institution, in connection with the extensive suite gathered by the Expedition, has developed some facts that appear to be of sufficient value and interest to warrant brief mention. Here as elsewhere the variation, through which the forms are indicated, are of two kinds, viz, a variation in size and a variation in coloration; nor is it easy to say in which direction the changes are most pronounced.

The only song sparrow found in eastern United States, and which extends from the coast as far west as Nebraska and Indian Territory, is the *M. melodia*; and of all the forms, except possibly *insignis*, this appears to be the most constant in the maintenance of its peculiarities over its wide habitat. In fact, so far as color goes, the variation appears to be scarcely noticeable; nor is the variation in size very marked. Such as it is, it appears to bear out the general rule of an average increase of size to the northward. This law, it may be remarked here, appears to be equally applicable also to all the other races. The general sameness in the topographical character of the eastern region and the resulting similarity of climate is doubtless the chief cause of the slight departure from type to be observed in *melodia* throughout its range.

The Rocky Mountains as far to the north as Oregon and to the south to our southern border, and the entire region west to the Sierra Nevadas, is occupied by the var. *fallax*. This bird is distinguishable from *melodia* by a generally paler tone of coloration, by a decided increase in size, especially of wing and tail, and by a slightly longer and considerably more slender bill. The intergradation of this form with *melodia* is readily traceable and complete. From the very varied nature of the country occupied by *fallax*, it being broken up by lofty mountain ranges, and the ensuing differences of climate, considerable discrepancies might naturally be expected in specimens of this race from different localities. Such proves to be the case; and, in examining a large series, the attention is often arrested by some slight phase of color which is often so intangible as to practically elude definition, but which occasionally is sufficient to identify all the individuals from some one limited neighborhood. So frequently is this impression received, that it would almost appear as if each locality in the middle region furnished

a type of its own, exhibiting the main characters of *fallax*, but differing more or less appreciably. Thus the region of the Gila River affords a style of this race quite distinct from any other. The principal variation is seen in the very pale reddish tint, with scarcely a trace of dusky, which is especially noticeable in the streakings on the breast.

Another phase from Camp Harney, Oregon, is remarkable for its pale grayish tints. Such inter-races are doubtless the result of causes very local in their action, and are so slight and inconstant as to deserve nothing more than passing notice.

Reaching the foot-hills of the Sierras we find *fallax* beginning to assume new characters, and in the mountains and along the western foot-hills it finally merges into var. *heermanni*. This form is characterized by a much darker shade of brown than either *fallax* or *melodia*, and by a bill much stouter than the former, but less robust than the latter. *Heermanni* has usually been considered the Californian song sparrow, the term thus including indifferently the birds both from the coast and the interior. But this is a mistake. The type now before me came from Fort Tejon, and it is in the interior only that the style to which this name was applied is met with.

Reaching the coast, another form is for the first time encountered. This is the var. *samuelsis*, of which the *gouldii* of Baird, as correctly determined by Mr. Ridgway, is the fall plumage. Hitherto some three or four individuals from the vicinity of San Francisco have been taken as representing all that was known of this race. But no fewer than forty-six specimens are now at hand that agree well with the type, and are unquestionably referable here. In point of fact, it is *samuelsis* alone that occurs in summer along and near the Californian coast, and nearly all published accounts of the habits, nesting, &c., of the song sparrow of California are to be taken as referring to it. This form rests chiefly upon its small size, it being by considerable the smallest of all the races, and the very dark, almost black, color of its prominent streakings. But it is upon a basis of size alone that it can be separated from *heermanni*, both agreeing in essential points of coloration. In fact, the question might well be raised whether it is necessary to recognize by distinct names two forms from this region. I have on the whole deemed it expedient to do so, as the difference of size, especially of bill, in specimens from the respective habitats of the two, as indicated, is pronounced and quite constant, readily sufficing in the great majority of cases for their identification. Thus in over thirty specimens of *heermanni* from Stockton, Cal., kindly furnished by Mr. Belding, I find no marked differences, and all the individuals from the interior that have been examined, representing many localities, agree in large size, the average being considerably in excess of those from the coast. A series of nine males, collected about Oakland, for the opportunity of examining which I am indebted to the courtesy of Mr. D. S. Bryant, of San Francisco, are similarly constant to the coast type so far as size is concerned, but vary somewhat in coloration. The differences are chiefly as to the number and size of the black streakings below, two of the nine being the darkest, and, on the whole, the most typical examples of *samuelsis* I have seen.

Of the var. *mexicana* Ridgway, from Southern Mexico, little can be said, since the name rests upon a single specimen. This individual appears to be recognizable from the other races by its rather peculiar coloration, the streakings being very broad as well as black, and by its small size. More specimens are necessary to determine its true relations.

Var. *guttata* next invites attention. This is characterized by a darker, more rufescent type of color; the streaks on the dorsum are very indistinct, in some almost wanting. The bill is proportionately more slender than in any of the preceding forms.

The typical home of this variety is the Columbia River region, coastwise. But long before reaching that point evidence is afforded by specimens of intermediate character of the change to appear farther to the north. Thus fall and winter specimens from Nicasio, evidently reared farther north, are unquestionably intermediate in coloration between *samuelsis* and *guttata*, while during the past season specimens were obtained by the expedition in Oregon upon the eastern slope, thus approximating the habitat of *fallax*, that are no less intermediate between that central region form and *guttata*, the two forms to the northward evidently passing, by insensible stages, into the latter.

Var. *rufina* is simply *guttata* with the tendencies of the latter carried a step or two farther, with increase of latitude. The rufous of *guttata* in extreme cases becomes a reddish sepia brown; the size is somewhat larger, the bill rather more slender. This is *rufina* as found about Sitka and southward.

Upon certain of the Alaskan Islands occurs *insignis*. This gigantic sparrow is distinguished, in addition to its great size, by a much paler, grayer phase of color than its nearest geographical neighbor, *rufina*. The streaks, instead of being nearly or quite obsolete, as in that form, are well defined and of an amber brown.

Of *insignis*, Baird and Ridgway say: "Between *M. melodia* of the Atlantic States and *M. insignis* of Kodiak the difference seems wide, but the connecting links in the inter-regions bridge this over so completely that with a series of hundreds of specimens before us, we abandon the attempt at specific separation." * * * It cannot be denied that the var. *rufina* from Sitka is nearer *insignis*, by many degrees, than the *melodia* of the East, and, as has just been indicated, nothing is wanting in the chain of

evidence to establish the connection between *rufina* and *melodia*. But, while admitting the possibility that the relations between *insignis* and *rufina* may be as close as that of races, we feel justified in asserting that the inter-gradation, necessary to establish this, cannot be shown from the material accumulated up to the present time. Measurements appended below demonstrate that between the largest specimen of *rufina* in the collection and the smallest of *insignis* there is a very wide gap. Nor does there appear to be any known law of geographical variation to account for this.

As has been stated, and in conformity with a well-known law, increase of latitude seems to be accompanied by a general increase of size. But this fails of application in the case of *insignis*, since Sitka, the typical locality of *rufina*, is in the same latitude with Kodiak; while one specimen of *rufina*, by no means the largest, is present from Lituya Bay, which is slightly farther north than that island.

Possibly its insular habitat may be deemed sufficient to account for the marked characters of *insignis*, since in their power of impressing peculiar features upon their zoological inhabitants, islands seem to have a law of their own.

Color alone considered, although in this respect *insignis* is well marked, the step from *rufina* appears inconsiderable when it is remembered the great change that has been traced between *rufina* and *melodia*. The gap in size is much more important. Analogy in cases like the present has proved far from being always a safe guide, and since, by the test of inter-gradation, the only reliable one, *insignis* remains widely apart from the others, I deem it far safer to allow *insignis* to stand upon its merits until its claim to distinct specific rank be actually disproven.

Measurements are appended to show the average size of the various races; the largest and smallest individuals of each series are also given.

	Wing.	Tail.	Bill.	Tarsus.	Depth of culmen.
<i>M. melodia</i> (average of 21 specimens)	2.60	2.80	.46	.83	.30
Largest	2.77	2.90	.47	.78	.29
Smallest	2.32	2.60	.45	.78	.30
<i>var. fallax</i> (average of 23 specimens)	2.69	2.94	.44	.84	.25
Largest	2.92	3.17	.43	.83	.27
Smallest	2.35	2.52	.43	.77	.25
<i>var. heermanni</i> (average of 13 specimens)	2.61	2.82	.45	.84	.28
Largest	2.80	2.93	.46	.84	.28
Smallest	2.45	2.70	.45	.83	.24
<i>var. samuelis</i> (average of 46 specimens)	2.41	2.48	.45	.84	.26
Largest	2.60	2.64	.45	.86	.26
Smallest	2.13	2.23	.40	.76	.23
<i>var. mexicana</i> (one specimen)	2.52	2.83	.46	.87	.26
<i>var. guttata</i> (average of 23 specimens)	2.63	2.89	.44	.90	.26
Largest	2.78	3.14	.46	.93
Smallest	2.42	2.59	.45	.83
<i>var. rufina</i> (average of 7 specimens)	2.78	2.87	.48	.92	.26
Largest	2.96	3.12	.52	.93	.29
Smallest	2.61	2.64	.43	.87	.25
<i>M. insignis</i> (average of 20 specimens)	3.26	3.39	.61	1.07	.30
Largest	3.40	3.40	.50	1.13	.32
Smallest	3.13	3.35	.57	1.07	.29

M. melodia fallax (Baird). Rocky Mountain Sparrow.

This form was met with at several localities at the foot of the eastern slope, although it is along here that the change towards the *heermanni* type is first indicated; some specimens, indeed, from near Carson, Nev., appear to be referable to the latter variety.

M. melodia guttata (Nutt.). Oregon Song Sparrow.

If the song sparrows taken in Oregon at the base of the mountains in September are summer residents, as is doubtless the case, then the habitat of this race includes a restricted portion of the eastern slope. The specimens alluded to, from Warm Springs Agency and Crooked River, while not typical, are nearest to the above race. At The Dalles, on the Columbia, in October, these birds were extremely abundant in the hedgerows and brier-patches and along the small streams. At this locality the specimens were nearly typical *guttata*.

PASSERELLA Swainson.

P. iliaca megaryncha (Bd.). Thick-billed Sparrow.

This curious sparrow is present along much of the eastern slope in summer, and probably reaches quite to the Columbia River. It was first seen near Carson, Nev., May 16, being at this date found in considerable numbers in the wild-cherry brush along the cañon sides. It was apparently still on its way north, although Mr. Ridg-

way states that the bird begins to move north about the 1st of March. At a later date I found the birds quite common in the scrub on the top of Thompson's Peak, at an elevation of rather over 7,000 feet; and by the last of July fully fledged young were taken. The bird is eminently a mountain form, thick brush being the prime essential to its choice of a home. It never, I think, descends into the low valleys, which, on the other hand, seems to be preferred by the allied form *schistacea*.

HEDYMELES Baird.

H. melanocephalus (Sw.). Black-headed Grosbeak.

By May 15 this species was very numerous about Carson, and appeared to be mating. Their food at this season appears to consist largely of the soft buds of various shrubs, especially of the willows.

How far north the species goes I am not aware, my note-book simply furnishing the statement of its presence in Northern California, but in much diminished numbers. As it reaches Fort Steilacoom along the coast, it may attain a similar latitude in the interior. Its habits of nidification appear to be everywhere about the same, and to correspond pretty closely with those of the rose-breasted. Its architecture is of the simplest kind, the nest being made up of fine weed-stalks and similar light material, which are arranged in as circular a form as the stiff, unyielding nature of the stems will allow. A lining of fine rootlets disposed in a shallow circular form completes the structure. This is almost always placed toward the extremities of the lower limbs of trees, often overhanging a stream or deep ravine; more rarely the nest is placed on bushes.

Three eggs are occasionally laid, more usually two. They are light blue, irregularly spotted with reddish brown and purple; usually, though not always, most thickly at the larger ends.

Considerable variation in size obtains between sets. Two measure $1.05 \times .73$, $1.02 \times .75$, and $.95 \times .67$, $.93 \times .68$.

CYANOSPIZA Baird.

C. amœna (Say). Lazuli Finch.

A common summer resident about Carson, but met with less frequently toward the north. Nevertheless, Cooper reports it from Puget Sound, and Suckley found it in numbers in spring at The Dalles, Oregon. It was found by us to breed up to an altitude of 7,000 feet.

PIPILO Vieillot.

P. maculatus megalonyx Bd. Long-spurred Towhee.

This, the only form of the towhee met with by us, is extremely numerous along the eastern slope as high as the Columbia River. I fully agree with Mr. Ridgway that specimens of the *Pipilo* found along the eastern slope of the Sierras are absolutely indistinguishable by external characters from *megalonyx*. They appear to show no approach to *oregonus*, as that variety is illustrated by individuals from the north western coast. Nor have I been able to find in the habits, songs, and notes of the *Pipilo* of the Sierras the striking peculiarities which had such weight with Mr. Ridgway as to induce him to identify it as *oregonus*, in the face of its apparent likeness to *megalonyx* in form and colors. On the contrary, the habits of the towhees, as they have fallen under my notice in the Rocky Mountains and in the Sierras, have appeared to be essentially the same. Mr. Ridgway was especially impressed with the fact that the mewing call, which all observers have attributed to *megalonyx*, was never heard by him from the form found near Carson. But a line in my note-book records the fact that this same mewing note was the *only* one heard by me at this locality. Cooper, however, says that the call-notes of these two forms are alike, so that they have no distinctive value.

In the matter of birds' habits, differing circumstances of observation enter so largely as factors in the results obtained by different observers, that such evidence becomes, at best, but a precarious means of discrimination, especially between birds closely related; as, for instance, the members of the genus *Pipilo*. Apparent discrepancies in records are by no means always, perhaps, in fact, only in comparatively rare instances, attributable to inaccuracies of observation. But too often the fact is overlooked, or practically ignored, that in birds of the same species, at the same locality, and even at the same time, there may be a very marked diversity of habits, which is an expression of nothing more or less than individual taste or the result of quite adventitious circumstances. Such being the case, it is scarcely to be wondered at that in distant localities, where the observer is ever on the alert for new facts, he should, not infrequently, be misled into false comparisons by a note new to his experience, or some hitherto unnoticed habit, which, perhaps, had it been marked nearer home, would have attracted but casual attention.

By the above, however, it is by no means intended to imply that such matters are not entitled to a place as aids to the proper understanding of the relation of species to each other. It is doubtless true that there is occasionally to be noticed certain changes in respect to the habits and songs of birds that accompany changes of locality, and which may furnish the first clew to external variation, in support of which they may be adduced as additional and valid testimony. But it is no less true that the purely individual variation in birds' songs and habits is often very great; in truth, such appears to be the rule rather than the exception; a fact which should be kept fully in mind when such features are made to enter into the question of specific or varietal distinctions.

P. chlorurus (Townsend.) Green-tailed Finch.

This sparrow is rather numerous in summer along the eastern slope, and reaches well into Oregon, if not, indeed, to the Columbia River.

Several nests with eggs were found in July.

ALAUDIDÆ—Larks.

EREMOPHILA Boie.

E. alpestris chrysolæma (?) (Wagler.) Horned Lark.

The usual central region form of the horned lark occurs rather numerous about Carson in summer upon barren pasture lands, sage brush, and alkaline flats, &c. Its breeding range extends into Southern Oregon, and perhaps even farther northward.

It appears to me that the identity of this central region form with the chrysolæma of Mexico is open to doubt and that its true place may be elsewhere. Pending an examination of the question, however, I employ the name in current use.

ICTERIDÆ—Orioles.

XANTHOCEPHALUS Bonaparte.

X. icterocephalus (Brewster.) Yellow-headed Blackbird.

This blackbird is extremely abundant in all suitable localities along the eastern slope far towards the Columbia River. In the latitude of Carson, it begins to breed somewhat before the middle of May, and by the 15th the tule beds, to which it always resorts, will be found to contain nests in all phases of construction, while a few pairs, more ardent or enterprising than the rest, possess their full complement of four eggs. By the 1st of June nearly every nest contained eggs in various stages of advancement, while in not a few instances the young had already made their appearance.

The habit of colonization at this period is carried in this species to an extreme not observable in any other of the family, unless, perhaps, it be the tri-colored, as that bird is found in Southern California. Thousands flock together to form a happy, noisy community, their songs filling the swampy recesses with a confused and indescribable medley. Though by no means melody of a high order, they fall not unpleasantly upon the ear rightly attuned to bird music, when they are correctly interpreted as a mere rendering into audible sound of the overflowing jollity and good humor of the birds as they trill forth the notes in a happy-go-lucky sort of style from the swaying reeds.

The nests, while usually built well up on the reeds and fastened to the upper stalks, are not always so situated, but are occasionally, as was noticed in several instances at Washoe Lake, placed close to the marshy ground among the coarse grasses. When such is the case, the structure is very similar to that of the common red-wing under like circumstances. As the nests so placed were among the earliest found, it is probable that the more usual positions—high up on the reeds—is exchanged for one affording better protection and security for the early broods.

Dr. Cones tells us that the males appear to desert the females during the period of incubation. But if this be a matter of observation, I think it is, to say the least, unusual. I have found the males of this species as domestic in their habits and as assiduous in attention to their young as any of the family. It is true, as observed by Mr. Nelson, that they are much shyer than their mates, the natural result of their more conspicuous colors and their distrust of danger on account of this. They are hence less often seen about the nest when it is disturbed.

AGELÆUS Vieillot.

A. phœniceus (L.) Red-winged Blackbird.

An abundant summer resident along the eastern slope. More or less winter about Carson.

A. phæniceus gubernator (Wagl.). Red and Black-shouldered Blackbird.

This form is less abundant than the former as well as less generally distributed along the eastern slope. It appears, as a rule, not to be found much east of this line, but it is reported from Camp Harney, Oregon, by Captain Bendire. It is noticeable in this connection that none of the specimens which are referable to this form from localities east of the mountains represent it in its typical condition. Thus from the neighborhood of Reno, Nev., at the eastern base of the Sierras, close to the border of California, we have a series of specimens the males of which have the crimson shoulder-patch bordered narrowly with light buff, *each feather of which border is black-tipped*. Such individuals appear to be just about half-way in development towards *gubernator*. It is interesting to note that in this same locality the *A. phæniceus* is also present (both breeding), and in as truly typical dress as anywhere in the West. What proportion of individuals represent either form I cannot say, but believe that by far the largest percentage of the *agelæi* here are *phæniceus*.

It would thus appear as though the eastern blackbird extends to about the line of the mountains unchanged; that here, the influences, as of climate, &c., first begin to be felt, which, only partially operative here, as they become intensified farther to the west result in effecting the color change which is seen in typical *gubernator*. In this instance it would appear that the influences are sufficiently strong to affect only a proportion of individuals, which from obscure reasons are more susceptible to their workings; while the majority remain true to their type.

If, as is usually understood to be the case, color varieties are identifiable with certain limited areas of distribution, it follows that, as in the present instance, where the species inhabits continuously a wide region, the changes of environment are more or less gradual, and hence at certain points or along a certain line of distribution it is brought under conditions which are intermediate in character and force—a sort of neutral ground, as it were. From such regions come the specimens which, though often the cause of no little perplexity to the naturalist from the difficulties in the way of their proper identification, are yet full of interest as furnishing indubitable proof of the intergradation of forms.

STURNELLA Vieillot.

S. magna neglecta Aud. Western Meadow Lark.

Very numerous throughout this whole region.

Most of the nests discovered were arched over, thus conforming to the usual plan of structure. In one instance the birds seemed to find the protection of the tall grass an ample safeguard, and the nest was merely a flat open structure, with no attempt at a roof.

ICTERUS Brisson.

I. bullocki (Swains.). Bullock's Oriole.

Very numerous about Carson and to the northward along the base of the mountains up to the Columbia River.

Begins to nest about Carson about the middle of May. After their arrival and during the early part of the summer, the orioles in this locality appear to obtain but very little of their subsistence among the trees, but resort in pairs to the hillsides, where on the ground among the sage bushes they appeared to glean a full harvest. The exact nature of this I did not ascertain; it is probably though some species of worm or caterpillar that infests these plants.

SCOLECOPHAGUS Swainson.

S. cyanocephalus (Wagl.). Brewer's Blackbird.

This blackbird is extremely abundant throughout this whole region as a summer visitant, while more or less remain through the winter.

Elsewhere, as in the Rocky Mountains, I have found little disposition on the part of this species to gather into communities at the breeding season. But in this region it is comparatively unusual to find this blackbird breeding in other than large colonies, and I have found a dozen nests in the space of thirty or forty yards.

The eggs of no one of our birds are subject to greater extremes of variation than those of the Brewer's blackbird. The differences are apparent not only in the amount of markings and their particular shade and character, but also include much variation in size and shape.

CORVIDÆ—Crows.

CORVUS Linnaeus.

The question of the existence in the Pacific province of a species or variety of crow different from *americanus* and *ossifragus* is an interesting one, and a discussion of some

of the points involved will not be uninteresting, even if an entirely definite and satisfactory conclusion respecting the relationships of the eastern and western birds be not reached. The name *caurinus* was proposed by Professor Baird in 1858 for a crow inhabiting the northwestern coast, and specimens were cited from Puget Sound and Washington Territory. The characters of the supposed species rested mainly upon its smaller size, together with certain peculiarities of habits and notes. But from the first, the exact habitat and status of the new species appears to have been somewhat doubtful, as at the time of description the above author included under *americanus* a number of specimens from contiguous regions in California and Washington Territory, their distinctness from the newly-described *caurinus* being assumed entirely on account of their large size, no other differences being discernible.*

Since then the different habits and notes of the crows of the Pacific coast have been remarked in turn by nearly every observer who has visited that region, and appear to have been the main cause of the retention of *caurinus*, either as a distinct species or a geographical race of the common crow. In fact, habits and notes aside, no one appears to have been able to find a single tangible character by means of which the so-called *caurinus* was to be recognized.†

Thus Captain Bendire, in his list of Camp Harney birds, in which he gives *caurinus* as a "rare summer resident," remarks: "If it were not for their [that is, *caurinus* and *americanus*] totally different habits, I could see no really good reasons for separating this species."

Dr. Cooper seems to have been equally doubtful of the relations of *caurinus*, and says, in "Birds of California," "I am now satisfied that there is but one species of crow on this side of the continent, and, if distinguishable at all from the eastern, it is by its smaller size, less graduated tail, more gregarious habits, and different voice." In conformity with this view, he includes in the habitat of *caurinus*, not only the Pacific coast, but the region "east to the northern Rocky Mountains," thus entirely excluding *americanus* from the Pacific region.

Assuming the position taken by Dr. Cooper, that but one species of crow is represented upon the west side of the continent, I have been able, after a careful examination and measurement of all the material afforded by the Smithsonian collection, to verify the statement of the smaller size of the crows from the Pacific States *only as a slight average*, while among specimens from this region are some of the *largest* individuals I have seen—three, respectively from Tulare Valley, Southern California; Fort Crook, Northern California; and Camp Harney, Oreg., being matched in size by but few from the Eastern States. Nor do the strictly coast-inhabiting birds appear to be much, if any, smaller than those from interior districts. At least they are not constantly so, since Dr. Cooper says "the smallest specimens I have seen were collected by Mr. F. Gruber on the west slope of the Sierra Nevada, about latitude 38° 30'."

The shape of the tails of west coast specimens appears to vary in no particular from eastern, and I am fully convinced that it is in vain to attempt to separate the crows of California, Nevada, Oregon, and probably Washington Territory from *americanus* by definite and reliable external character, the range of that species, therefore, in my opinion, embracing the Pacific as well as the Central region.

But from the region north of Washington Territory the crows appear to undergo a general diminution in size, this being especially marked in respect to the length of tarsus; all the specimens at hand from the northwest coast (including one from Shoalwater Bay) agree in small size and extremely short tarsus. The general size of these birds is but little in excess of the average of *ossifragus*. But in no other particular are they like that species, being, in fact, save in the one particular of size, indistinguishable from eastern *americanus*. It was remarked by Professor Baird that the *Corvidæ* appear to form an exception to the general rule, and that "the same species in southern localities are larger than those from points farther north." This statement will require qualification in the case of *Corvus var. floridanus*, which, while averaging in general size a trifle smaller than Northern-born birds, yet offers, in the increased size of bill and feet, a marked contrast to them. But as applied elsewhere in the United States the statement appears to hold good, and especially on the other side of the continent, where a decrease of size with increased latitude appears to be the rule. Possibly this simple statement of fact is all that the difference in size exhibited by the crows of the extreme northwest requires.

As considerable stress has been laid upon the different habits of *caurinus* it may be

* Prof. Baird further remarks of *caurinus*, after enumerating the points by which it may "readily be distinguished from the eastern fish crow," "it is so much like the *Corvus americanus* as to be only distinguishable by its inferior size and habits. Indeed, it is almost a question whether it be more than a dwarfed race of the other species."

† In the recent work, "Birds of North America," by Baird, Brewer, and Ridgway, a further distinctive feature is assigned to *caurinus*, viz, the fact that the tarsus is shorter than the bill. But this statement resulted from an incorrect method of measurement, as Mr. Ridgway now informs me, the tarsus being measured on its anterior surface, at the end of the feathering, instead of from the joint, thus giving a length too short by a very appreciable amount. With the exception of the diminutive Mexican species (*C. mexicanus*) all the North American crows agree in having the tarsus longer than the bill.

well to consider these briefly; and, first, it is to be remarked that nearly all the differences in habits and notes appear to apply as well to the crows found throughout California, Oregon, and Washington Territory as to those of the region to the north, while, as has just been stated, it is only in the latter region that these are accompanied by a single salient character that will serve to identify the skius.

If habits be taken as the test, then all alike—those from the far interior of Oregon as well as from the coast, from California northward—must be held to be *caurinus*, although, as has been stated, a large proportion of specimens from Washington Territory southward absolutely differ in no particular of form or color from others from the Eastern States.

If, on the other hand, small size, as exemplified especially in the short tarsus, be held sufficient to characterize the race, then those only from north of Washington Territory are eligible to the name; and all from below, although sharing in the habits which have been held to distinguish *caurinus*, must be considered as *americanus*, notwithstanding, too, the additional fact that the measurements of some few of the smallest of these latter approximate somewhat closely to Alaska specimens.

It may be added that while observers agree in the general statement of the possession by the so-called *caurinus* of peculiar habits, the accounts of each vary as to the details, change of locality evidently producing a corresponding change in habits. Thus the domed nests, made of mud, which *caurinus* is said by Lord to build about Sitka, differ entirely from those found by Bendire in Oregon, and by Cooper in California, which resembled the usual style of the common crow. Nor do the piscivorous habits of *caurinus* offer anything very distinctive, since they are shared by the common crow of Florida (*var. floridanus*), which there has many of the ways of the true fish crow (*ossifragus*). About Washington, too, the common crow and fish-crow go in associate bands, and their notes alone can be relied upon to identify them as they feed together along the river. As further evidence of the varying habits of the crows, it may be stated that in this locality the fish crow in turn often abandons its usual littoral haunts for the plowed fields and pastures of the interior. In fact, with birds possessing the omnivorous taste of the crows it appears to be quite a matter of accident that determines their hunting grounds, those where food is most abundant and readiest at hand being the favorite; hence, of course, its nature varies indefinitely with locality and circumstances.

The alleged more pronounced gregarious habits of *caurinus*, even allowing all that is claimed, are probably but the result of exceptional conditions, and appear to be carried in the northwest but little farther than is observable in the common crow at the East. Even on the Pacific coast the habit of breeding in colonies is far from universal. When such colonies are formed they are as likely to be the result of necessity as of choice. As, for instance, when favorable breeding grounds are scarce, a more or less extensive colonization must necessarily follow, which is less marked when other conditions prevail.

As to notes, this much may safely be stated, that some, at least, of the crows of the Pacific province have a note different from the usual one of *americanus*. As Dr. Cooper says, this "differs rather in tone than in character." In other words, it is the old-fashioned caw, but uttered in a different tone. In Southern California, near the coast, and in Oregon, east of the mountains, I have on many occasions heard this note, which has strongly suggested that of *ossifragus*, and which I then took for granted as belonging to *caurinus*. But in every such instance the well-known ringing caws of *americanus* were recognized from the same flock. Of six or eight individuals shot from these flocks all proved to be indistinguishable from *americanus*, and at the time I presumed the particular individuals of *caurinus* must have escaped me. Now, however, I feel tolerably well assured that all alike were *americanus*, the notes varying in individuals. Mr. Ridgway, on the other hand, informs me that in his experience in the Sacramento Valley, Nevada, &c., he never heard any but the common note of *americanus*.

In conclusion, the general tenor of the change of habits of the Pacific crow, so far as any are to be noticed, is in the direction of the fish crow (*ossifragus*), and by at least one author the two have been regarded as identical. But in the proportions of certain parts and in colors they are very distinct from *ossifragus*, which may readily and infallibly be distinguished from the common crow from whatever locality by a number of well-defined characters.

At present I deem it, on the whole, advisable to recognize a race of the common crow from the extreme northwest coast, from Puget Sound northward, assigning, as characters, small size in general, and especially a short tarsus, at the same time admitting the possibility that a larger series from the region in question, together with additional data concerning habits, &c., may suffice to show its distinctness as a species. On the other hand, I am assured that no features are to be found attaching to the crows, either of the west coast or interior south of the above-mentioned point, that will warrant the maintenance of a name. They, at least, are *americanus*.

A series of measurements is appended below to afford means of comparison of the crows of eastern and western United States.

MEASUREMENTS.

	Wing.	Tail.	Bill.	Tarsus.
AMERICANUS.				
East of Rocky Mountains:				
Average of 25 specimens.....	12.36	7.24	1.85	2.39
Largest individual (Massachusetts).....	13.00	7.45	2.00	2.60
Smallest individual (New Mexico).....	11.50	7.00	1.72	2.25
California and Oregon:				
Average of 8 specimens.....	11.78	7.21	1.78	2.30
Largest individual (Fort Crook, Cal.).....	12.90	7.95	1.95	2.23
Smallest individual (Stockton, Cal.).....	11.00	6.80	1.60	2.23
VAR. CAURINUS.				
Puget Sound, Alaska:				
Average of 7 specimens.....	10.82	6.68	1.70	2.00
Largest individual (Puget Sound).....	11.60	7.25	1.88	2.12
Smallest individual (Alaska).....	10.25	6.00	1.68	1.95
VAR. FLORIDANUS.				
Florida:				
Average of 4 specimens.....	12.05	7.12	2.04	2.49
Largest individual.....	12.50	7.25	2.10	2.50
Smallest individual.....	11.45	7.00	1.93	2.42

C. carnivorus, Bartr. American Raven.

A resident species; more or less common everywhere save in the higher mountain districts.

Pyramid Lake, Nevada, forms a favorite resort for ravens during the summer, as the perpendicular and inaccessible cliffs about certain parts of the lake present an abundance of sheltered ledges and cavities where they love to place their nests. I noticed that in one spot several pairs had built within the space of a few yards, a somewhat unusual circumstance, as ravens are not apt to be socially inclined at this period.

C. americanus, Aud. Common Crow.

Although by no means as generally distributed in the far West as in the Eastern States, the crow is yet found in probably each and all of the States and Territories west of the Mississippi. At all events it has not been wanting in any of those entered by our parties.

Whether its presence in the more remote Western States, as affirmed by many of the settlers, is a comparatively recent event, or whether the cultivation of the wilderness and the orchards and grain fields that have succeeded the advent of the pioneers have simply been the means of bringing the crow into direct contact with man, and so of making its presence felt, are questions not easy to determine. I am inclined to believe, however, that the crow had made good a squatter's right to the country long before the date of the white man's possession, and to attribute its present unquestionably greater abundance in sections and territories where at first it was unnoticed to the fact of the concentration of the species into civilized districts, where its sagacity soon taught it a living was to be had the easiest.

I have never heard laid to the door of the crow the charge of any serious depredations on the corn and grain fields of the new Territories, and fancy that the kuavish tricks of its eastern cousins, that have earned them so bad a name, have not spread so far—possibly another reason for supposing that the western birds are not recent migrants from the east, else surely they had not left behind such profitable tricks as pulling up newly-sprouted corn and other devices of a like nature. Doubtless its natural food here is more abundant, and hence, the struggle for existence being less sharp, the crow finds it less needful to employ its wits to the end of getting a living at other folks' expense.

In Oregon, especially east of the mountains, crows are very numerous indeed, and I saw many large flocks on the various cattle ranges, as well as, later in fall, on the stubble fields. Meadowy pasture land and the vicinity of streams are the favorite resorts. The only difference between them and the "Jim Crow" of the east that I could detect was, at times, a difference in the cawing note, which, however, as stated above, seemed to attach only to individuals, the greater number in the various flocks holding to the old-fashioned caw.

The "smell for gunpowder" has evidently not been cultivated to the extent that is

popularly attributed to the New England crow, and it proved a comparatively easy matter to obtain specimens. However, what crows, no matter where hatched, don't know about taking care of themselves is very soon acquired, and a very little experience will be found to go a long ways with them. Naturally the crow is no shyer than other large birds, and its extreme wariness at the East, instead of being an indication, as some writers are prone to construe it, of a natural trait, is simply due to persecution, and to it alone.

PICICORVUS Bonaparte.

P. columbianus (Wils.). Clarke's Crow.

A constant and abundant resident of the pineries.

GYMNOKITTA Maximilian.

G. cyanocephalus (Maxim.). Maximilian's Jay.

A numerous and constant resident of the low ranges of piñon hills. Along much of our route from Northern California northward along the base of the Sierra and Cascade Ranges this jay was entirely absent, the nature of the country being unsuited to its peculiar economy. At certain points in the Des Chutes Basin, however, it was noticed in great numbers. Here they were feeding upon a purple berry, the source of which I could not ascertain, but of which their crops were full, as well, too, upon the seeds of the yellow pine.

I am indebted to my friend Mr. H. G. Parker, of Carson, Nev., for an account of the nesting habits of this jay in his neighborhood. He informs me that late in March thousands breed upon the piñon hills, the colonies consisting of a variable number of pairs; occasionally isolated nests are found, but this appears to be rather exceptional.

Eggs were taken April 10.

The single nest he has sent for examination shows an unexpected degree of taste and skill in the arrangement of the material, which is drawn very largely from the piñons. An external base of twigs, which appear to have been broken off from the ends of the branches, affords firm support for the nest proper, which is a compact, deeply hollowed cup, made of strips and shreds of bark from the sage bush. Finer strippings of the same with a few straws complete the lining.

The nest is usually placed near the top of the tree, sometimes near the extremities of the branches, occasionally close to the trunk. In any event it is but a few feet from the ground, for the piñon rarely indeed attains a height of twenty feet.

The coloration of the eggs is very peculiar, and they are unlike those of any other jay that I have ever seen. They are greenish-white, marked with numerous spots of brown and purple. As usual, this latter tint is due to the overlaying crust of shell, and is not, strictly speaking, a normal color. The markings are thickest at the greater ends, and tend towards aggregation in circles. A set of four eggs measure $(1.27 \times .87)^2$, $1.27 \times .88$, $1.27 \times .87$.

PICA Vieillot.

P. melanoleuca hudsonica (Sab.). Magpie.

In the settled portions of Nevada and Eastern California of slight elevation, and especially in the wooded tracts that mark the courses of the streams, the magpie is a constant resident, and one which, from its size and general conspicuousness, is not liable to be overlooked. The thickets along the Carson River serve as favorite breeding grounds for great numbers of this species; in fact, I have never seen it more abundant than here.

As noisy and as easily irritated into vociferous demonstration as is the magpie under ordinary circumstances, no sooner has the breeding season fairly begun than, under influence of the new feelings and emotions that have sprung into existence, our magpie seems to lose its voice, and, from being one of the most garrulous of the feathered community, subsides into a very quiet and matter-of-fact sort of individual, as if perfectly aware of the danger its usual boisterousness is likely to bring upon its home. To prove that this quiet demeanor is but a cloak assumed for a season, in obedience to an instinctive apprehension of danger, it is only necessary to approach with too curious eyes the nest of one of a community of pairs, especially if it chance to contain young. Under such circumstances the intruder will find himself the target for imprecations and anathemas, delivered with such unction and effect from a dozen angry throats, that he will probably be glad to finish his investigations in a hurry and retire from the ground. In such a strait the pairs make common cause, and their audacity is in strong contrast to their usual wariness.

In the neighborhood of Carson every thicket of sufficient density to screen its bulky nest contains one, oftener several, of the structures, that are so characteristic as to at once proclaim their ownership.

While the magpie is to no inconsiderable extent a sharer in the natural enning, so justly attributed to its relatives the crows, a fact in its history now and then comes to notice which would appear at first thought to negative the possession of this trait; as, for instance, the place and position in which their nests are occasionally found. Not only do these often seem to be imperiled by their proximity to the ground, being sometimes but a foot or two above it, but at times not the slightest attention will be paid to their concealment. I have in mind a certain point along the Carson River where some dead trees are found, in which the magpies have nested for apparently a long period, and where their nests are visible for a distance of many hundred yards. But as a matter of fact the eggs or young are less liable to danger than would at first thought be supposed, and doubtless experience has taught the birds this. In selecting sticks and twigs for the outer nest the magpie, probably by design, chooses such as, from their scraggly, thorny nature, they are enabled to so firmly interlock that all chance of forcible entry except through the small aperture in the side left for the purpose is cut off, and every foe provided against except man alone. Indeed, I have myself, more than once, found it a far from easy matter to gain the interior through this thorny barrier.

So far as humans are concerned the magpies have but little to fear, as their marketable value, fortunately for themselves, amounts to next to nothing. For, notwithstanding the fact that they may, when taken in hand young, be readily tamed and, after the proper manipulation, be taught to talk, they are so noisy and their dispositions so extremely mischievous, that a short experience usually results in their being voted a nuisance, and hence they stand in low favor. So a few taken for pets and an occasional nest destroyed by mischievous boys sum up the dangers of the magpie's housekeeping.

The labor of this is pretty evenly divided. Upon the females devolves the main task of incubation, relieved now and then by their partners. The latter are away from home most of the time busily occupied in foraging, since not only have they their own appetites to appease, but it is their duty to provide for the females engaged in their enforced duty. Upon the appearance of the young both birds share equally in attention to their wants.

About Carson the eggs are not deposited before the 1st of March, but as late as the 12th of May quite a number of nests were found to contain fresh eggs.

CYANURA Swainson.

C. stelleri frontalis, Ridgw. Blue-fronted Jay.

This form of the Steller's jay has been traced by the expedition from the Coast and Sierra Ranges of Southern California into the Cascade Mountains of Oregon, and so on up to the Columbia River, at which point, however, the form does not cease, but continues into Washington Territory.

As is well known, this bird is represented in the Rocky Mountains by the long-crested variety, in which the streaks of the forehead are of a faint bluish-white instead of blue, and the upper eyelid is conspicuously patched with white. Two specimens collected at the base of the Cascade Range are worthy of note in this connection, since, while they represent the normal *frontalis* type in every other particular, both show unmistakable traces of this white patch, which in one is quite conspicuous; a hint, as it were, of the new character to be assumed farther to the eastward.

A description of the young in first plumage is subjoined.

First plumage.—Above, dark plumbeous; head darker, with no trace of blue streaks on forehead; wings blue, barred with black, as in adult; belly light blue; breast and throat plumbeous; chin with light space.

CYANOCITTA Bonaparte.

C. floridanus californicus (Vig.). Californian Ground Jay.

Numerous in the brushy foot-hills to a considerable distance north of Carson, Nev. A single specimen, the only one seen, was taken at The Dalles, on the Columbia, October 4, and it perhaps occurs here and there over the intervening ground.

Nuttall found the species common at Fort Vancouver, on the west side of the Cascade Mountains, in October, and indicates its occurrence as far north as the Frazer's River. This was in 1834, and it appears to have escaped the observation of all the more recent explorers of the same region. Recently Mr. C. Roop, of Portland, Oreg., informed me that this jay is abundant near the mouth of the Willamette River, in both Oregon and Washington Territories.

All the specimens we have seen from along the western slope, although not typical of the above race, are best referable to it.*

*In which connection see annual report of this survey for 1877, p. 1305.

A description of the first plumage of this form is added from a fledgeling taken at Eagle Lake, California, in July.

Prevailing color above, plumbeous brown; head with bluish cast; wings and tail blue, as in adult; below ashy white; feathers on throat and breast showing no traces of streaks; sides of head and an imperfect bar across breast dusky plumbeous. A conspicuous white line above and behind the eye.

PERISOREOUS Bonaparte.

P. obscurus, Ridgw. Oregon Gray Jay, "Meat Bird."

This bird was not recognized as distinct from the Canada jay (*P. canadensis*) until quite recently, when Mr. Ridgway described under the above name specimens from Shoalwater Bay, and indicated Washington Territory, Oregon, and the northwest coast generally as its habitat. Mr. Ridgway, however, included the form under head of *canadensis*, presuming it to represent the Pacific coast variety of that bird, as *capitalis* does the Rocky Mountain form.

A recent investigation, in connection with Mr. Ridgway, of a better series of specimens than was available when *obscurus* was described, leads to the belief that this form is entirely distinct from the Canada jay, its peculiarities being of a kind not explainable upon any theory of geographical variation. As good descriptions of *obscurus* are found elsewhere, I need here merely allude to its chief distinctive points, viz: the conspicuous white shafts of the feathers of the back and scapulars, and the ashy white under parts, tending to brown only along the sides. In these particulars it differs conspicuously from the others.

During the past season *obscurus* was found to be a resident of the mountains from Northern California to the Columbia River, its range being thus extended very materially. The young in nesting plumage were taken near Camp Bidwell, California.

My specimens from the above region agree with the types in essential respects; in fact the only difference appears to be in regard to the amount of white, especially on forehead, it extending farther back towards the occiput than in the coast examples, while the general tints also are lighter.

A comparison of specimens of the Canada jay from Alaska and Maine reveals considerable difference. In fact, extreme examples of the Alaska type appear to show peculiarities of color sufficient to warrant their separation as a variety. Even, however, in the small series from the former region in the Smithsonian collection, there is a very noticeable amount of purely individual variation, and some specimens cannot be discriminated from Maine examples. So that, on the whole, I do not consider the difference sufficient to justify a new name.*

That the Rocky Mountain form *capitalis* intergrades completely with *canadensis* there can be no doubt, although typical specimens of *capitalis* offer very tangible differences. In the northern Rocky Mountains, as in Montana, the peculiarities of this race very sensibly diminish, and the tendency towards the *canadensis* type is marked. From farther south and in its region proper, no specimens appear to be found which are not wholly characteristic of *capitalis*.

The following measurements express the variations in size between the forms :

	Wing.	Tail.	Bill.	Tarsus.
<i>P. canadensis:</i>				
Average of 6 specimens.....	5.61	5.93	.75	1.35
Largest individual.....	5.84	6.07	.83	1.45
Smallest individual.....	5.33	5.54	.73	1.33
Alaska specimens, <i>P. canadensis:</i>				
Average of 7 specimens.....	5.43	5.66	.77	1.33
Largest individual.....	5.67	5.65	.85	1.40
Smallest individual.....	5.10	1.26
Var. <i>capitalis:</i>				
Average of 10 specimens.....	6.04	5.99	.80	1.36
Largest individual.....	6.35	6.12	.82	1.40
Smallest individual.....	5.72	5.55	.73	1.34
<i>P. obscurus:</i>				
Average of 7 specimens.....	5.53	5.38	.71	1.31
Largest individual.....	5.78	5.58	.69	.321
Smallest individual.....	5.23	5.12	.72	.261

* Since the above was written Mr. Ridgway informs me that he has given the name *fumifrons* to the Alaskan coast form.

As will be noticed, Alaska specimens appear to average considerably smaller than those from Maine.

Var. *capitalis* undergoes a decided increase in length of wing, without a corresponding increase in size of tail.

In *obscurus* the proportions of wing and tail are reversed, it being the only one which has the tail shorter than the wing.

Habits.—As Northern California is reached, the Oregon gray jay becomes a familiar object of attention in the pine woods, of which it is a constant resident. Along the Upper Des Chutes River the "meat birds," as they are suggestively termed by the hunters, were very numerous; so numerous, in fact, and so quietly persistent in their attendance about the cook-fire, that they became positive nuisances. When they are inclined towards familiarity, they carry their boldness to a surprising extent. Every morning about sun-up, from six to a dozen or more presented themselves in the trees overhanging camp, and the momentary absence of the cook from his charge was construed as an invitation to the feast, and down they swooped upon the nearest morsel of food. Almost everything edible seemed to be acceptable, although their preference for raw meat was plainly evidenced. Finally, when the cook's patience gave out, the shotgun was brought into requisition, which diminished the number, without having any visible effect in checking the rapacity of the survivors. Several were readily caught by means of a bent pin fastened to a string and baited with scraps of venison. They are not always by any means so bold as in this locality, and a dark form, visible for an instant as it flits noiselessly through the sombre pines, is often the only proof of the presence of the species.

I have always found the Rocky Mountain gray jay to be a very silent bird. But this species has a variety of odd notes, a sort of squeaking, whining call being the most common. Cooper also assigns this species a "considerable variety of song."

TYRANNIDÆ—Tyrant Flycatchers.

TYRANNUS Cuvier.

T. verticalis, Say. Arkansas Flycatcher.

A very numerous summer resident. It was not observed by us farther north than Southern Oregon, but doubtless this was owing to the lateness of the season, as it was found by Suckley at The Dalles, and even farther north in Washington Territory. The *T. carolinensis* was not met with, but, according to Mr. Ridgway, occurs in summer in Western Nevada (Truckee Valley).

MYIARCHUS Cabanis.

M. cinerascens (Lawr.). Ash-throated Flycatcher.

Common on the foot-hills near Carson, but apparently a rare summer visitant farther north along the eastern slope. A single individual was seen at Honey Lake, California.

SAYORRNIS Bonaparte.

S. sayus (Bp.). Say's Flycatcher.

Numerous along the eastern slope. This species is in the habit of building about barns and outbuildings, in this respect being like the eastern Phoebe. A curious nesting site selected by one pair was a little niche in the sandy wall of a disused well, and some twenty feet or more from the top. The problem of getting the young up the old birds had yet to solve.

The *S. nigricans* appears not to be present in this region, although it is common to the west of the mountains in Oregon.

CONTOPUS Cabot.

C. borealis (Sw.). Olive-sided Flycatcher.

This flycatcher occurs in summer all along the eastern slope up to the Columbia River, and probably still farther to the north. It does not appear to be as numerous here as in the Rocky Mountains, or even in the region west of the Sierras.

C. virens richardsoni (Sw.). Western Wood Pewee.

A common summer visitant of the mountains. A nest found June 26 contained two eggs somewhat advanced.

This flycatcher appears to vary the position of its nest, sometimes building in the

fork of a limb, at other times placing it on the broad upper surface—in other words, saddling it. The same variation in plan is observable in the nests of our eastern pewee, although in both, the latter method seems to be the favorite.

The nest alluded to above, as also a second found July 23, was saddled upon the terminal fork of a cottonwood, and was similar to the usual style of the eastern pewee, except that the exterior lacked the customary sprinkling of lichens given it by the latter bird. Instead it was dressed with shreds of a white cottony substance and gray fibrous bark, which served admirably to harmonize its tints with those of the light bark of the tree, precisely the same end being thus attained as effected by the other bird, each using the material best adapted to its own case. It would indeed be a "blind" instinct that should induce the western pewee to adopt for its nest the cloak of lichens, the invariable and successful resort of its eastern relative, an instinct that would prove fatal to the safety of its home, and only serve to invite the very danger of conspicuousness which it is its chief object to avoid. The contrast of differing means to the same end which is displayed in the architecture of these two flycatchers is one of many equally good illustrations which might be cited to prove the presence in birds of a something higher than mere hereditary instinct, and shows that only by granting the existence of an amount of reasoning power can we explain the readiness with which a species adapts its existence to new conditions, and the fertility of resource which prompts the choice of means to a necessary end.

EMPIDONAX Cabot.

E. trailii, Aud. Trail's Flycatcher.†

Western specimens of this bird have usually been considered to represent a light-colored race, and have found mention under name of *var. pusillu*. I think Mr. Ridgway is correct in the view recently expressed,* and that western and eastern birds do not differ sufficiently to warrant their separation.

The *pusillus* of Swainson was accepted by Professor Baird as applying to the western bird, but apparently with some doubt, as Swainson's description applies almost equally well to *minimus*. I prefer, therefore, to fall back upon the *trailii* of Audubon, including under this name both eastern and western birds.

The Trails flycatcher is a numerous summer resident of the eastern slope, well up into Oregon. It loves to frequent the willow thickets along the streams, even following them to a high elevation in the mountains.

E. obscurus (Sw.). Wright's Flycatcher.

Apparently rather uncommon as a summer inhabitant of the mountains, where only it is found at this season. It appears in summer never to frequent the same situations as the preceding bird, although the two may inhabit the same general locality. Thus, the borders of a stream which meanders through an alpine valley, and which is hedged by willows, will be found, almost to a certainty, to be inhabited by the little flycatcher, while the present species never intrudes on the domain of this bird, but is contented with the hillsides above, where it lives under the pines and among the chaparral.

It would be interesting to study out the probable causes which thus lead two species so closely allied as these two flycatchers, with the same general habits and economy, with precisely the same method of capturing food, and living within sight, as it were, of each other, to so maintain their own preserves as never to clash with each other. A possible explanation suggests itself in varying tastes as to food, since it is probable that each locality differs enough in the character of its plants to harbor different kinds of insects, and hence to furnish each species with its own particular bill of fare.

A nest found June 22 contained four fresh eggs. These are yellowish-white, and unspotted. The nest was an extremely neat, pretty structure, composed externally of strips of white bark, with an internal lining of fine grasses and feathers. It had a depth of two inches, and an internal diameter of the same. It was singularly exposed to view, being placed on an open bush on a hillside, where it was overshadowed by large pine trees.

The *E. hammondi* is said to also occur along the eastern slope, but I did not meet with it.

CAPRIMULGIDÆ—Goatsuckers.

CHORDEILES Swainson.

C. popetue henryi, Cass. Western Night Hawk.

An extremely abundant summer visitant through California, Oregon, and into Washington Territory.

* Ornithology of the Fortieth Parallel, page 539.

Several sets of eggs were found, which seemed to have been deposited on the ground hap-hazard, with little or no attention to special locality.

ANTROSTOMUS Gould.

A. nuttalli, Aud. Nuttall's Poorwill.

In the neighborhood of Carson the poorwill arrives from the south in the early days of May. It soon becomes generally and commonly distributed over nearly all the region embraced in the present report, being scarcely less numerous towards the north. Both Cooper and Suckley note its presence in the portions of Oregon and Washington Territory, east of the mountains, and indicate negatively its absence to the west.

TROCHILIDÆ—Humming Birds.

STELLULA Gould.

S. calliope, Gould. Calliope Humming Bird.

The range of this diminutive humming-bird is now pretty well made out. It has long been known as a resident of the west coast, and there extends over much of California, Oregon, and Washington Territory, where in summer it is confined to the mountains. To the eastward its summer habitat appears to be in general limited by the eastern slope, along which, in Nevada, California, and Oregon, it was found by our parties to be very numerous. In fall, at least, it reaches as far into the middle region as the East Humboldt Mountains, where found in August by Mr. Ridgway. New Mexico and Arizona, as determined by our parties, complete its limited range in the central regions and likewise its known dispersion within our limits. It may breed in the latter Territories, as specimens were obtained in July. That it does so along the eastern slope there is no possible doubt, as about the middle of June, in Eastern California (Honey Lake), I often saw the females most busily at work gathering stores of down from the willow catkins, then hanging full, to weave into nests. I was left to conjecture that the location of these was in the high branches of the firs and other evergreens, as I failed to discover a single one, which could hardly have been the case had they been in positions at all accessible.

The males were at that season very restless and wary, and to procure specimens proved no easy matter. The flower which here is most resorted to, not alone by this but by other hummers, is a species of *Castilleja* which is found along the banks of most all the mountain streams. Wherever these blossoms are numerous, the hum of wings of these busy little pilferers as they dart to and fro is constant.

Humming-birds have, however, in this section, another and less usual source of food supply, to which my attention was attracted while in the mountains near Camp Bidwell. For several of the early hours of morning I noticed that the humming-birds hovered about the upper branches of the firs and spruces, precisely as if feeding, to the entire neglect of the flower-bordered streams which occupied their attention later in the day. As this is the time when they are hungriest, I could only account for their actions on the supposition that they were feeding upon "honey dew." As this may not be familiar to all my readers, I will state that it is a sweet saccharine substance that is deposited upon the foliage of trees and shrubs in many localities of this region by certain small insects, the plant-feeding *Aphides*. It is often found in considerable quantities, so considerable in fact that in some places, as I was informed, the Indians collect it by threshing the plants after the sun has evaporated it into a sugar, and make use of it as food. That it is sweet and palatable, I myself can testify, and doubtless as much so to the delicate taste of the humming-birds as to the human palate. In early morning, before the sun's rays have evaporated it, "honey dew" is found in a semi-liquified state, and then would be as easily managed by the brush-tipped tongues of the birds as the nectar of flowers. Without doubt, too, the birds secure many small insects which resort to feed upon this substance.

Here I wish to notice what I believe was an error of identification on the part of Dr. Cooper when he mentioned the broad-tailed humming-bird (*S. platycercus*) as common at Lake Tahoe in September.* This is quite out of the area of the known distribution of that bird, which is distinctively a central region species. *Stellula*, on the other hand, is a common summer resident of this region and could scarcely have been overlooked. It is not, however, mentioned by him from that locality. Hence I infer that his specimen of supposed *platycercus* was really the *Stellula*, more especially because he appears to have been in doubt, and states that at first he supposed the species to be *S. rufus*. In this latter supposition he may have been correct, but as, farther on, when speaking of the *Stellula* as seen in the Cascade Mountains, he says he there mistook that species for the young of *S. rufa*, we may presume his mistake to have been the same

* Birds of California, vol. 1, 1870, p. 357.

in both instances, and that the Lake Tahoe birds were the *Stellula*, as the Cascade Mountain birds proved to be. It is to be remarked that the young of several of the hummers are really so much alike, especially those of *calliope* and *rufus*, that a very careful comparison, which is rarely possible in the field, is necessary to distinguish them.

TROCHILUS Linnaeus.

T. alexandri, Bourc. and Muls. Black-chinned Humming Bird.

This species appears to be a by no means common summer resident along the eastern slope, and to have there a limited distribution. It was observed and specimens were procured in June in Eastern California along Honey Lake. Farther north, in the mountains near Camp Bidwell, the species was present in July.

SELASPHORUS Swainson.

S. rufus, (Gmel.). Rufous-backed Humming Bird.

This hummer is probably rather local as a summer resident of the eastern slope. In the summer of 1876 I did not find it breeding in Eastern California, although plentiful enough there in fall. It appeared to be rather numerous in summer near Camp Bidwell.

ALCEDINIDÆ—Kingfishers.

CERYLE Boie.

C. alcyon (L.). Kingfisher.

Of common occurrence on all the fish-stocked streams.

PICIDÆ—Woodpeckers.

HYLOTOMUS Baird.

H. pilcatus (L.). Pileated Woodpecker.

The "log cock" was not noted by our party at any point along the eastern slope notwithstanding that the heavily timbered mountains would appear to favor its presence. On the Columbia, to the west of the divide, it was said by the lumbermen to be a numerous and constant resident. I shot a fine male, the only one seen, at the Cascades, in October.

PICUS Linnaeus.

P. villosus harrisi (Aud.). Western Hairy Woodpecker.

Numerous as a resident of the pineries.

P. pubescens gairdneri (Aud.). Western Downy Woodpecker.

Along the eastern slope, as everywhere throughout the middle region, this is a rare species, and but a single individual was seen—in Chewaucan Valley, in Angnst.

P. albolarvatus (Cass.). White-headed Woodpecker.

This woodpecker appeared to be less common everywhere along our route to the north than in the pineries immediately west of Carson. It occurs nevertheless here and there as a resident.

PICOIDES Lacépède.

P. arcticus (Sw.). Arctic Woodpecker.

A rather common and constant resident of the pine woods from Carson northward into Oregon.

SPHYRAPICUS Baird.

S. varius nuchalis (Bd.). Red-naped Woodpecker.

This middle region form extends across from the Rocky Mountains, and occurs in summer along the eastern slope. Beyond this we have no evidence of its presence, it being replaced upon the west coast by the following bird.

Mr. Ridgway alludes to the fact that in the region between the Rocky Mountains and the Cascade Range specimens of this form give evidence, by the admixture of red in the black auricular stripe, the black pectoral collar, and in the white area surround-

ing it, of the change soon to result in the variety *ruber*, in which these parts are red. Two males, however, taken in the Warner Mountains, Northern California, show no such tendency, but, on the contrary, are not distinguishable from Rocky Mountain specimens.

S. varius ruber (Gm.). Red-breasted Woodpecker.

Somewhat to my surprise I was able to obtain no evidence that this variety summers along the eastern slope, and am compelled to believe that it is only found here in the character of a fall and winter visitor.

S. thyroideus (Cass.). Brown-headed Woodpecker.

Of rather frequent occurrence all through the mountains.

ASYNDESMUS Cones.

A. torquatus (Wils.). Lewis Woodpecker.

Nowhere in its wide range is this species more abundant than at the base of the eastern slope, through Nevada, California, and Oregon. It was seen at The Dalles during the last of October, and according to Snekley it remains here during the winter

COLAPTES Swainson.

C. auratus mexicanus (Sw.). Red-shafted Flicker.

An abundant and widely-distributed species. The birds of the eastern slope appear to be the typical *mexicanus*, and I have never seen a specimen from this region showing intermediate characters. In the Sacramento Valley and about San Francisco such specimens are comparatively common, and the manner and degree in which individuals assume the characters of either race vary indefinitely.

STRIGIDÆ—Owls.

STRIX Linnæus.

S. flammea americana (Aud.). American Barn Owl.

Though a very common inhabitant of California, especially in the southern portion, and extending, according to Cooper, as high as the Columbia River, this owl appears to confine its range, so far as this region is concerned, to the country west of the Sierras, and it does not appear in any of the sectional lists east of that range between Kansas on the east and Arizona on the south. That it does occur on the east side of the Sierras I obtained ample proof during the past season. Near the Madeline Plains in Eastern California I found scattered feathers of barn owls, indicating that they inhabited the thickets along the streams. At Camp Bidwell it seemed to be a tolerably common species, and on several occasions individuals were started up as they were roosting among the tangled willows. This was late in September. It also appears to be of at least occasional occurrence in Western Nevada, and Mr. H. G. Parker has information of the capture of a specimen or specimens near Carson.

It is one of the most strictly nocturnal of the family, and as its diurnal retreats are usually of the most inaccessible character, the bird readily eludes casual observation. Hence it is likely to prove to be more widely diffused in the interior province than we are at present aware.

OTUS Cuvier.

O. vulgaris wilsonianus (Less.). Long-eared Owl.

Numerous in the thickets of the lowlands, where it is resident throughout the year.

O. brachyotus (Stev.). Short-eared Owl.

This owl was found to be common in the sedgy marshes about Warner Lake, Oregon, and doubtless inhabits similar localities throughout Eastern California and Nevada.

BUBO Dumeril.

B. virginianus sub-arcticus (Sw.). Western Great Horned Owl.

Often heard in the mountains, where it is resident. Two individuals of the many seen were obtained in the Cascade Mountains. They represent the common interior type.

SPEOTYTO Gloger.

S. cunicularia hypogæa (Bp.). Burrowing Owl.

Numerous in all suitable localities through this region.

FALCONIDÆ—Hawks, Eagles, etc.

CIRCUS Lacépède.

C. cyaneus hudsonius (L.). Marsh Hawk.

Very numerous in every suitable locality.

ACCIPITER Bonaparte.

A. fuscus (Gm.). Sharp-shinned Hawk.

A single specimen only of this hawk was obtained, at the Columbia River, in October.

A. cooperi (Bon.). Cooper's Hawk.

Appears to be much more numerous in this region than the preceding. Seen on the Columbia in October.

ASTUR Jard. and Selby.

A. atricapillus (Wils.). American Goshawk.

This fine hawk was seen at several points along the Cascade Mountains in Oregon, where it, without doubt, breeds.

I had very little chance to observe its habits; probably they do not differ essentially from those of its smaller relatives. One that I shot on the Williamson's River was in hot chase of a kingfisher, which he doubtless would have seized in another moment. Another, on the same river, was noticed chasing a night heron. The attack was persistently kept up, but evidently with no intention on the part of the hawk of making the heron his prey. Forcing the heavy-winged heron into the open, the hawk would close in and apparently give the ungainly bird a buffet with his wing, which each time produced a loud and discontented squawk. It occurred to me, as a possible solution of the motive of the hawk, that he intended to force his victim to throw up any fish it might have secured, and so furnish him an easy dinner.

FALCO Linnæus.

F. lanarius polyagrus (Cass.). Prairie Falcon.

A widely-diffused species, and common in certain localities of this region, as near Camp Bidwell.

In the fall its habits as truly entitle it to the appellation of "duck hawk" as its relative the *F. anatum*. The latter, although not falling under our observation, certainly occurs in this region, but by no means as commonly as its ally.

F. richardsoni. Richardson's Falcon.

The presence of this falcon was noted in several localities in Oregon and Northern California, and two specimens in immature plumage were taken.

F. sparverius (L.). Sparrow-Hawk.

Very common throughout this whole region.

The west side of Chewaucan Valley had suffered severely from a visitation of that scourge of the western farmer, the grasshoppers. Here in August the sparrow-hawks had assembled in hundreds and were holding high carnival, and although in instances like the present their numbers prove wholly insufficient to cope against the vast myriads of these destructive insects, yet the work of the sparrow-hawk is by no means so insignificant that it should not be remembered to his credit and earn him well-merited protection. His food consists almost entirely of grasshoppers when they are to be had, and as his appetite appears never to become satiated, the aggregate in numbers which are annually destroyed by him must be enormous.

BUTEO Cuvier.

B. swainsoni (Bp.). Swainson's Hawk.

Very numerous in summer in the low partially-wooded country near the mountains. I noticed more of these hawks in Northern California than farther south, but this in-

crease in numbers may have been only apparent, and due to their concentration as fall approached.

B. borealis calurus (Cass.). Western Red-tailed Hawk.

Numerous throughout all the heavily-wooded portions of the region.

ARCHIBUTEO Brehm.

A. ferrugineus (Licht.). California Squirrel Hawk.

A hawk was seen in Northeastern California which I believed to be of this species.

A. lagopus sanctijohannis (Gmel.). Rough-legged Hawk.

Common in fall in marshy localities.

AQUILA Brisson.

A. chrysaetos canadensis (L.). Golden Eagle.

Occurring more or less numerously among the mountains.

HALIAËTUS Savigne.

H. leucocephalus (L.). American Eagle.

This eagle may fairly be said to abound on certain of the mountain lakes of this region, Eagle Lake indeed receiving its name from the number of these birds that inhabit its shores. Rarely disturbed, they are much less shy than usual, evidence of this fact being apparent in the accessible situations which their nests occupy. Several were noticed in the splintered tops of pines, the low heights and convenient branches of which placed them within easy reach.

One nest that I visited as late as July 10 contained two young, still unable to fly, though in size fully grown.

Along the Columbia, eagles are so common that they scarcely attract attention. Here they are useful as scavengers, and dead and dying salmon form a very considerable portion of their fare.

PANDION Savigne.

P. haliaëtus carolinensis (Gmel.). Fish Hawk.

Present on nearly all the streams and lakes that furnish fish. Extremely abundant at Klamath Lake.

CATHARTIDÆ—American Vultures.

RHINOGRYPHUS Ridgw.

R. aura (L.). Red-headed Vulture.

Generally distributed; in some localities, as near Honey Lake, California, very numerous. Not seen at the Columbia River in October. Nor was the Californian vulture (*Pseudogryphus californianus*) observed along the river, although, judging from the accounts of Cooper and Suckley, it formerly periodically visited its shores, attracted thither by the dead salmon, which, during the "run," often line the banks. The accounts of these authors date back to 1854, and since that time the numbers of this huge vulture have been so diminished by the use of poison, intended to kill off wild animals, that it is now in comparison almost extinct, and the sight of a California vulture is at present a rare event in localities where a few years ago it was very numerous.

COLUMBIDÆ—Doves.

ZENAIDURA Bonaparte.

Z. carolinensis (L.). Turtle Dove.

Arriving in the vicinity of Carson about the 1st of May, the "doves" soon become extremely numerous, not only here but all along the eastern slope, far up into Oregon and Washington Territory.

By the game law of Nevada this species is exempt from protection at any and all seasons, and as it is about the only bird here that affords wing-shooting, it hence, in the neighborhood of the towns, receives considerable attention at the hands of the gunners, especially during the early portion of its visit in spring.

It begins to nest about the middle of May, and then its persecution perforce ceases, since it no longer resorts to the stubble-fields and pastures for food, but, having paired, retires to the hills, where it is out of reach.

The numbers killed, although in some sections very great, appear to have no visible effect in diminishing its abundance.

It migrates south early, and but few are to be found in Nevada by the end of August. As late as the 23d of September I noticed a few young birds, probably the late second broods, still lingering about the stubble along Crooked River, Oregon.

COLUMBA Linnæus.

C. fasciata (Say). Band-tailed Pigeon.

At The Dalles I caught a glimpse of a solitary individual which I identified as this species. It is said by both Cooper and Suckley to be abundant to the west of the mountains, and doubtless wanders across the range with greater or less frequency, the abundance or scarcity of food, especially acorns, having much to do in determining its presence or absence in a region. Dr. Newberry speaks of it as occurring at The Dalles in fall.

TETRAONIDÆ—Grouse.

CANACE Bonaparte.

C. obscurus (Say). Dusky Grouse.

The "blue grouse," which is found in the Sierra and Cascade Ranges, at least along their eastern slopes and as high up as the Columbia River, is the typical middle region form, *obscurus*.

The mountain forests, especially those composed largely of firs and spruces, abound with this fine game-bird. Several broods of young chicks were found about the middle of June.

First plumage of young.—Feathers of the back and wings (except primaries) with broad central line of white, and marked transversely with spots and bars of black and rufous brown; throat and belly brownish white; breast and sides of body profusely maculated with black.

CENTROCERCUS Swainson.

C. urophasianus (Bp.). Sage Hen.

Numerous as is this species in many portions of the Rocky Mountain region, it appears to be even more abundant in the sterile tracts that lie just east of the Sierra Nevada and Cascade Ranges, where it is generally diffused in all suitable localities from a point well up towards our northern boundaries to as far south as the Mojave River where reported by Cooper. The most southern point at which the bird was encountered by our parties was about fifty miles south of Carson, as indicated by Lieutenant Macomb. Somewhat to the north of here it begins to be very numerous, and in certain localities, as near old Camp Warner, Oregon, its numbers are simply astonishing. A day's ride through this section in almost any direction will reveal band after band, many containing numerous individuals.

During the summer it inhabits preferably the low mountains and hills, which are only saved from utter barrenness and destitution by a growth of sage or brush of similar kind and a scanty covering of coarse grass. The little valleys intervening contain occasional springs, which with the surrounding plats of green verdure form little oases, and these are the centers around which congregate, at least thrice a day, all the sage-hens within a considerable area. When making the usual night's camp we have often started up fifty or more of these big grouse almost within stone's throw of the solitary pool of water. At midday, too, flocks of old and young love to come in from the sterile tracts where they have been feeding, to drink and bathe and repose in the grateful shade which they find only in such spots.

After the young are able to run about, I believe the mother bird assumes sole charge over them, and that the old cocks assemble into bands and remain by themselves. I have on several occasions seen a dozen or more old males, lean in flesh and with plumage soiled and worn, thus associated. The old cock, under such circumstances, is a wary bird and knows well how to take care of himself. Little need, however, has he of his caution, since his toughness and general unsavoriness will be likely to cause anyone who once has made his acquaintance on the table to give him a wide berth in the future. But it is some time ere the young learn fully the necessary lesson of caution and self-dependence, and even after they have become almost fully grown they may frequently be put up one by one and killed without causing the dispersion of the rest of the band.

In fact, the tameness of the sage hen when, say, two-thirds grown, is occasionally so remarkable as to appear scarcely credible. As an instance, I remember on one occasion, when in one of the wilder districts of Oregon, pointing out a pair to a comrade, who had expressed a desire to try a shot on the wing at this, to him, new game. Unscreened by cover, the pair permitted him to approach within a dozen feet or so, regarding with mild wonder his demonstrative motions, and even failing to take alarm when dirt and pebbles were tossed at them. With the remark that they were too slow game for him, my disgusted friend left them to resume their picking among the herbage, which they did while we were still regarding them.

During the months of June, July, and August the young are very tender, and, if properly attended to by being drawn as soon as shot, are fair eating, but this is the limit of praise that my taste, at least, will permit me to bestow.

PEDICETES Elliott.

P. phasianellus columbianus (Ord). Southern Sharp-tailed Grouse.

This grouse appears to be entirely absent from Eastern California and Western Nevada, except in the upper districts. About Camp Bidwell, Cal., the "sharp-tails" are sufficiently numerous to afford excellent shooting, and good bags may be made there. Farther north in Oregon, and especially on the grassy plateaus that border the Columbia River and on the rolling hills for a hundred miles south, it is extremely abundant. Most of this section is quite uncultivated, and the grouse live among the dry hills and get fat upon their natural food of seeds, berries, and insects. They descend regularly into the valleys, as well to get water as to roost in the brush at night. A stubble-field of wheat is sure to attract them in great numbers, especially towards fall, and they seem to prefer this fare to aught else.

I have never had any experience in the field with the true prairie chicken (*C. cupido*), but, judging from the written accounts, the general habits of the two birds are extremely similar.

BONASA Stephens.

B. umbellus sabinii (Dougl.). Red Ruffed Grouse.

This form of the ruffed grouse occurs abundantly along the eastern slope, although perhaps not until Oregon is entered. At least, Fort Klamath was the first point at which I obtained undeniable proof of its presence.

It may here be remarked that the grouse of this region, while referable as above, do not typically represent the variety *sabinii*, which reaches its maximum of development, as indicated by depth of color and redness of tint, only on the Pacific slope.

In the dense coniferous forests that border the Columbia, as it passes through the Cascade Mountains, these grouse are found in very great abundance, the almost impenetrable undergrowth of deciduous bushes, with their nutritious fare of buds and berries, greatly favoring its presence, as offering both food and cover.

It is scarcely necessary to add any details respecting the habits of this bird; for in this remote region it appears the exact counterpart of the familiar partridge of New England. True, they are here very tame and almost devoid of fear of man; so tame are they, in fact, that without a dog it is well nigh useless to attempt their pursuit. Provided with almost any sort of a cur that will run through the bushes and bark when the birds wing their way to the nearest tree, which they will invariably do when started, almost any desired number may be potted; for "pot hunting" it is, and nothing else.

Much the same statement may be made of the conduct of the ruffed grouse in the more remote New England districts, as in some unfrequented parts of Maine; so, with a statement of general conformity of habits, the subject may be left.

PERDICIDÆ—Quails.

OREORTYX Baird.

O. pietus (Dougl.). Mountain Quail.

Judging from the personal field experience of the past three seasons, this fine game-bird is much more numerous within an area of twenty-five miles of Carson than anywhere to the northward. In fact, it is only at rare intervals that it appears to cross the mountains and appear along the eastern slope. Evidence upon this point is not so full as could be desired, since its introduction at the hands of man at certain points renders the question of its natural distribution in this region a difficult one to determine. In general, it is safe to say that the places where they have reached and maintained a residence along this slope are very few. Nevertheless, about Carson, at Eagle and Honey Lakes, Cal., and at The Dalles, on the Columbia, their presence was de-

tected, and is to be accounted for through the natural dispersion of the species. Elsewhere as at several localities near Camp Bidwell, Cal., the several covies are the descendants of birds brought from the Pacific slope and let loose to shift for themselves. They are nowhere in this region very numerous.

Description of first plumage of young.—Prevailing color of the head, neck, back and breast grayish olive, more plumbeous beneath, and everywhere more or less sprinkled with white; the markings on the breast larger and of more regularly deltoid form; chin, whitish; throat and cheeks mixed with dark plumbeous, a dusky auricular patch with an indistinct whitish line just above. Crest, $1\frac{1}{4}$ inches long; black, with tips irregularly marked with zigzag lines of pale fulvous. Scapulars, wing-coverts, tertials, and rectrices pale brownish, finely vermiculated with dusky. Abdomen whitish; flanks marked with chestnut and white; bill blackish; feet pale brown.

LOPHORTYX Bonaparte.

L. californicus (Shaw). California Valley Quail.

This quail is nowhere indigenous along the eastern slope, as the high mountains offer a complete barrier to its extension. Those introduced about Carson appear to just hold their own.

CHARADRIIDÆ—Plovers.

ÆGIALITIS Boie.

A. vociferus (L.). Killdeer Plover.

An abundant summer inhabitant of this whole region, the mountains excepted. Nests on the marshy borders of all the lakes. Numerous fresh eggs were found at Washoe Lake, Nevada, May 30.

RECURVIROSTRIDÆ—Stilts, Avocets.

RECURVIROSTRA Linnæus.

R. americana (Gmel.). American Avocet.

Our knowledge of the range of this species over the United States is so full and complete that little remains to be added. Except immediately upon the Pacific coast, where it is found in comparatively small numbers, no portion of the Rocky Mountains and the region to the westward has been entered by our parties without finding this bird, at the proper season and in suitable localities, abundant.

During the migrations its distribution in the West is extremely general, and its presence is to be expected along all of the streams, ponds, and lakes, except, perhaps, in the highest mountainous districts, from the Mississippi to the Pacific.

In the breeding season its range is scarcely less restricted, and those sections only are exempt from its visits that lack the necessary requisites to its mode of life at this period.

In the neighborhood of Washoe Lake, Nevada, it is especially numerous, and here, about the middle of May, I found the birds paired, while some, at least, were building. They were first noticed on some small ponds near the shores of the lake, a locality quite typical of their choice at this season. The muddy flats of such little inlets always prove more attractive to birds of their habits than larger bodies of water, inasmuch as the shallows permit them to wade about with perfect freedom; while food, which in summer consists very largely of the larvæ of aquatic insects, is more abundant in these tepid waters, as well as more readily obtained. I have sometimes thought that *alkaline* marshes and ponds were really preferred by these birds, attributing this choice to the possible fact of the greater abundance of the larvæ alluded to in such. Be this as it may, the fact that water happens to be extremely brackish and alkaline is at least no drawback to the avocets.

While the avocets are waders in the fullest meaning of the term, they are also adept swimmers when choice or necessity calls; but of this accomplishment, so far as my observations go, they rarely when unmolested avail themselves. I remember on one occasion to have seen a wing-tipped avocet trust itself pluckily to the waters of a broad lake and swim steadily out, though in the face of a gale that I should have thought a duck could scarcely have stemmed; since which time I have always entertained a high opinion of the natatorial powers of this species, although, as remarked before, they are usually held in abeyance.

On the occasion of my first visit to the place mentioned above, I found the birds, with now and then a stilt, in considerable force, and so great was their solicitude at my intrusion and so vehement their outcries, that I took it for granted I was in

immediate proximity to their nests. My search proving of no avail, I accepted without hesitancy the apparent fact that I had anticipated by a few days their nesting-time; and it was not until June 1 that I learned the full extent of the deception that the wily birds had practiced upon me.

While collecting at that date in a very similar locality half a mile or more up the lake, I found myself possessed of their secret, and in the midst of a large colony of both avocets and stilts, while numbers of the nests of either bird rewarded an easy search. As was plainly to be seen, it was their foraging trips that carried them away from home to the place where I had at first encountered them. Even at this remote point, their anxiety, real or pretended, had enabled them to effectually blind me as to the actual situation of their breeding-ground.

If the outcries of the few had been noticeable before, the confusion of sound resulting from the combined numbers of the whole colony was simply bewildering. The unfortunate pair whose nest I first stumbled upon used all the artifices common to birds in such a strait to entice me away. They would run furtively about a few yards distant, and then squat close down to the ground, and grovel in the loose earth as if settling over their eggs, while they kept uttering subdued coaxing notes as though calling to imaginary young. Their efforts at simulating the actions of wounded birds, which was the evident significance of the drooping wings and staggering gait adopted, were not very successful, and the nature of the deception was too apparent to deceive even a novice. After a while they appeared to become convinced of the futility of these attempts, and then rage took the place of sorrow. Flying about me in wide circles, the various pairs screamed and scolded till apparently exhausted by the excess of their emotions, when they betook themselves to a safe distance. I could not help fancying that the amount of sympathy extended the bereft birds by their neighbors was in pretty exact ratio to the proximity of their own nests, those pairs being the most venturesome and vehement whose own danger appeared greatest, while away on the verge of the marsh stood quietly or fed leisurely about, in fancied security, those couples whose distant homes seemed not to be threatened.

In placing its nest the avocet shows a certain degree of cunning, and for this purpose usually avails itself of some little islet or isolated strip of marshy ground where its eggs and young are comparatively removed from the danger of intrusive visits from all four-footed prowlers. One enemy they have from which this situation offers no protection. I refer to the inland gull of this region, the *Larus californicus*. Gulls, as is well known, are very fond of eggs, and never allow a chance of robbing other birds to pass by unimproved. In the present instance the outcries of the abused avocets had attracted the attention of a flock of the above birds that had been hovering over the lake, and, apparently scenting their opportunity, they swept in on poised wings or moved in gentle circles, awaited a favorable moment to descend to the feast.

That both avocets and stilts were well aware of the proclivity of these new foes was soon apparent. For when one of the gulls, becoming, perhaps, impatient, flew in close to the nests, all the birds near, forgetting on the instant their human enemy, combined to repel this fresh assault. Gaining a vantage ground above the big birds, they pounced down, striking their foes with wings and bills, until the gulls were forced to a hasty and ignominious retreat. These attacks and counter-attacks were repeated several times, until the gulls, discomfited by their warm reception, left the vicinity.

The eggs are laid in plain view, and are quite unprotected by grasses or other screening. The slight hollow, scratched and patted down in the damp soil to receive them, is occasionally quite thoroughly lined, oftener very slightly, with bits of weeds, stalks, &c. The number of eggs varies from two to four.

HIMANTOPUS Brisson.

H. nigricollis (Vieill.). Black-neck Stilt.

The mode of life of the stilt is, in all important particulars, like that of the avocet, and so invariably have the two birds been associated when under my notice, especially at the breeding period, that anything which brings to mind the one species is sure to recall the other. This companionship is a purely accidental one, arising from an independent choice of the same localities, under the promptings of similar tastes as to food and other necessities. Both are waders par excellence. But if the stilt ever swims at all, and it doubtless possesses this power to a certain extent in common, I believe, with each and every member of its long-legged fraternity, it must be only in extreme emergencies. I have myself never seen it take to the water under any circumstances. In many other minor particulars of habits and actions the two birds differ.

In the West one may expect to find the nests of the stilts alternating at short distances with those of the avocets, as if the two were unconscious or at least indifferent to each other's presence. Indeed, in many instances it would be no easy task to satisfactorily identify the eggs of the two species in the rabble of parent birds that hover around the intruder, were it not for the fact that the very considerable difference of size in the birds is exemplified in the eggs, those of the stilt being very perceptibly the smaller, corresponding with its more slender and everyway less bulky body.

When a colony of the two species is disturbed, they seem to vie with each other in the importunity of their attempts to mislead the intruder. Thus it often happens that the egg collector will find himself at his wit's end to determine the precise ownership of a clutch of eggs before him in the dozen or more stilts and avocets which are flying about. He has only to exercise a little patience and remain quiet until the excitement of the birds has had time to abate somewhat, when pair by pair the strangers will drop away till one or two only are left. From these he will soon be able to pick out the owners of the particular nest by their more persistent and manifestly greater solicitude.

The young of both species leave the nest almost immediately upon being hatched, and I have several times found them in a condition so weak and helpless that they seemed scarcely able to stand, much less walk; suggesting indeed, by their helplessness, the possibility of their having been removed from the nest by the parent birds upon the first sign of danger.

PHALAROPODIDÆ, Phalaropes.

STEGANOPUS Vicillot.

S. wilsoni (Sab.). Wilson's Phalarope.

Of the three species of phalaropes the present is much the best known, probably because of its very general diffusion throughout the interior, and because it breeds abundantly with us.

In the region in question it has been found to be plentiful, both as a spring and fall migrant and as a summer resident.

This phalarope was first noticed about Washoe Lake, Nevada, May 17, and the first arrivals from the south probably occur early in this month. By the 23d many had paired, and much anxiety was manifested when I approached certain localities in the marsh, where, however, I could find no nests. At this date they were probably just about ready to lay, and a female, when dissected, was found to contain a well-developed egg.

For nesting purposes this bird appears always to prefer the borders of little pools, and the grassy, boggy edges of prairie sloughs, to the neighborhood of large bodies of water; and in this region one rarely approaches a locality of the nature of those first mentioned without being met by one or more pairs of phalaropes, that come flying to meet the visitor with subdued and solicitous notes that clearly betray their anxiety to learn the character of his errand.

As their nests and eggs have often been described, they need not be touched upon here.

LOBIPES Cuvier.

L. hyperboreus (L.). Northern Phalarope.

Of more common occurrence upon either coast, this phalarope is yet occasionally found in our interior during both the spring and fall migrations. Thus the last week of May the little ponds and inlets about Washoe Lake were found to contain numerous flocks, large and small, all which seemed to be in the greatest possible haste to reach points unknown farther to the north.

The little phalarope unites in itself the characteristics of several families, and seems, as it were, a sort of connecting link between them. Thus in it appear the general outlines and trimness of form that distinguish the sandpipers, joined to a plumage much like a duck's, while the lobing of the feet appears to be modeled after the plan of the coot's. Its habits express these peculiarities of structure very nicely, for in nimbleness it simulates the sandpipers, if, indeed, it does not surpass them; while very few of the latter can compare with the lobe-foot in grace and elegance. Added to these qualities, its natatorial powers, when are taken into account its diminutive size and pigmy strength, are really of first-class order.

It is difficult to imagine a more beautiful sight than that presented by a flock of these phalaropes as in their brightly-colored nuptial dress they pass with graceful action along the shallows in search of food. In some respects their movements when thus engaged are peculiar and quite unlike those of any other bird with which I am acquainted. The flocks I saw kept closely together, and in a compact body moved hastily along, each bird gleaning the ground as he advanced by a continuous movement from side to side, the body being turned quickly, as on a pivot, and the bill lowered into the water with a quick thrust. This action gave each bird the appearance of describing at every movement a full half circle, while the motions of the whole flock were so constant, rapid, and uniform that they resembled more the actions of a living machine moved by one impulse than a flock of individual birds actuated by separate wills. In the manner described they passed in a very few moments over considerable space, and I think it likely that these flocks were actually migrating at the time; at all events, the course maintained by them, as long as they were under notice, was a due northerly one.

Like most other species whose "make-up" enables them to swim and wade with equal facility, our phalarope prefers the latter, and when feeding quietly only avails itself of swimming when it encounters some deep channel that interferes with progress. Or, again, when disturbed by too close scrutiny, they take to the water with an assurance that indicates it is no novelty to them. Thus they frequently became alarmed under my espionage and swam to the midst of the pond, and, having put between us what they considered a safe distance, gathered quietly in a compact circle and awaited further developments with an air of wonder and innocent expectation that was very amusing, as well, too, as touching in its utter unsophistication.

This species attains a nearly full development of the nuptial plumage within our limits, as was evidenced by the birds referred to here.

The females, as in case of the other two species, are much the brightest of the sexes, and the most highly colored male hardly equals the dullest female.

Upon dissection, evidence appeared of strong sexual excitement in both sexes, and I am inclined to believe that this phalarope will yet be found to breed along our northern frontier, possibly even in the mountains of Oregon. In fact, Dr. Cooper speaks of having seen a pair of either this species or the red phalarope in the Cascade Mountains of Washington Territory in August, which he thought were probably breeding. The latter species has never fallen under my observation in the West, and it is chiefly maritime.

SCOLOPACIDÆ—Snipe.

GALLINAGO Leach.

G. wilsoni (Temm.). Wilson's Snipe.

Although the range of the Wilson's snipe during the migrations covers the United States from ocean to ocean, its breeding limits are much more circumscribed, being chiefly along and beyond our northern borders. But in many of the mountainous sections of the far West it finds a climate and conditions well adapted to its needs, and here it passes the summer at a somewhat lower latitude than in the East. In Oregon, as also throughout all that portion of Eastern California and Western Nevada to the north of the line of the railroad, the Wilson's snipe may be confidently looked for in summer in all the little mountain meadows and along such alpine streams as by virtue of their overflow are bordered by the soft, oozy spots which are so indispensable to its habits. As often as otherwise these tracts occur among pine timber at quite elevated altitudes.

I first became aware of its presence in Nevada June 15. At this date, while making camp just at dusk near a small stream at the base of the mountains, I heard for the first time the peculiar sounds which are made by this snipe during the excitement of the love season, and I confess that at first I was not a little puzzled to explain their authorship. Afterwards I had several opportunities to observe the birds in the very act of producing them. The first impression received, shared in, too, by other members of the party as the sounds were borne to the ear from a distance, was that they were the notes of one of the small owls, muffled and disguised by reason of the remoteness of the bird. As the snipe flew nearer, and particularly as it passed directly overhead, the nature of the sound became more apparent, it then being comparable, as closely as anything I could think of, to the whistling noise which is so marked a peculiarity in the flight of the common dove (*Zenaidura*). This was the comparison that was suggested to all the party at the time, although it fails to give a very precise idea of its peculiar character. Mr. Ridgway hearing the snipe from a distance likens it to the "noise produced by water escaping from a nearly full jug," it having "a hollow, gurgling sound." However observers may differ in interpreting its peculiarities, no one, I think, who hears under favorable circumstances the sound we have attempted to describe, is likely to agree with Nuttall in his supposition that the sound proceeds from the bird's throat. It is unquestionably due to the wings alone.

The *modus operandi* is somewhat as follows: Mounting high in air the bird flies rapidly and excitedly back and forth, and at intervals of every moment or two, and while at full speed, the head is lowered, the wings bent and stiffened, and a downward plunge made at an abrupt angle, which terminates suddenly with a sharp ascent; and it is at the moment that the downward is changed to the upward flight that the sound is produced. To make such an extremely abrupt change in the line of flight possible, the wings must be bent into an unusual shape, and by reason of their action upon the air comes the whistling sound.

During the mating, and in fact through most of the breeding period, and continuing even after the young are hatched, the birds begin these evolutions as soon as dusk comes on, and continue them at irregular intervals until about nine o'clock. The notes are not heard again till about daybreak, and they cease before sun-up. But should the day be cloudy the snipe may be seen flying in the manner described till late in

the morning, often, indeed till nearly noon. I think that the males alone are concerned in the production of these odd notes; but of this I am not sure. The sexes have a harsh call-note in common which they utter as they fly casually about, which may be expressed by the syllables *kâ-kâ-kâ-kâ*; thus very different from the "musical" scarp-scarp, so familiar to every sportsman.

Other evidence is not wanting to show that our long-billed friend of skulking proclivities allows the events of the love season to quite turn his head, and various are the idiosyncrasies that take the place of his usual staid habits. One need not, then, be surprised upon putting him up in summer to find him alighting on a tree or fence-rail, and, so perched, to stand for long intervals as though rapt in deep meditation.

In the region in question the snipe apparently begins to nest some time in May, and by the middle of June I found young not fully divested of the down.

Several nests were found with the cracked egg-shells lying immediately about. They are usually built on a tussock of grass, if indeed the term building is applicable to the slight structure made by bending down a few grass blades and adding a few bits of withered herbage.

TRINGA Linnæus.

T. minutilla Vieill. Least Sandpiper.

Common during the migrations.

EREUNETES Illiger.

E. pusillus (L.). Semipalmated Sandpiper.

As preceding.

TOTANUS Bechstein.

T. semipalmatus (Gmel.). Willet.

Present about Washoe Lake in May, where it probably breeds, as it certainly does in many similar localities to the northward.

T. melanoleucus (Gmel.). Greater Yellow Legs.

Numerous as a migrant. Flocks of this species were seen on their way south as early as July 27.

TRINGOIDES Bonaparte.

T. macularius (L.). Spotted Sandpiper.

A summer visitant throughout this region, although not very numerous.

NUMENIUS Linnæus.

N. longirostris (Wils.). Long-billed Curlew.

Numerous as a summer resident along the marshy borders of the large lakes, but most abundant during the fall migrations. In August the stubble-fields near Goose Lake were fairly dotted with these birds, busily at work hunting grasshoppers.

TANTALIDÆ—Ibises.

PLEGADIS Kaup.

P. guaranna (L.). Bronzed Ibis.

This ibis has an extensive range in the west, it finding place as occurring at one season or another in nearly all the local lists of the country west of the Mississippi River. It reaches to the north as far as Southern Oregon, where it breeds. As the species was not found by Bendire about Camp Harney we may perhaps assume that the above is about its northern limit. Nowhere is it more abundant than in the region from the line of the railroad to Northern California and Nevada, being there found in summer as an inhabitant of the tulle swamps on all the lakes large and small, except in the high mountains.

Its general habits are much like those of the herons, and the marsh and slough are not more essential to the mode of life of the latter birds than of the glossy ibis. During the migrations, it is true, flocks of ibises may be seen feeding in plain view in the open shallows along shore, but it is quite exceptional to find them in such situations during the breeding season. Apart from their habit of nesting among the rushes they seem to prefer the secrecy and solitude conferred on them by the sheltering reeds, and

if the marsh be treacherous and oozy so much the better is it likely to prove for their special purposes as favoring complete isolation. While duck-shooting the report of my gun has frequently started up a dozen or more of these ibises, that sprung with hoarse croakings from little muddy pools and recesses almost within stone's-throw, where, screened upon all sides, they had been quietly feeding without conveying a hint of their presence.

Inherent in the nature of the ibis there is a certain wariness which to some extent makes amends for its natural stupidity. For, to few birds does the term stupid apply with more force than to the present species. The very "make-up" of the bird is suggestive of a sluggish disposition, there being evident a certain ungainliness of form that it is impossible to associate with keen intellectual activity, and that is the very reverse of what is implied by the alert actions and elegant appearance of its allies, the herons. Doubtless the long, heavy bill and slender neck surmounting its thickset body contribute much to its uncouth appearance, and convey an impression which the really beautiful plumage serves only partially to dispel. However, the ibis may safely claim that, even if its appearance is not in all respects pleasing to the eye, its ensemble has at least the beauty of utility, and its stout legs and long toes and claws, its heavy, curved bill and long neck all serve most admirably the purpose intended, which is, after all, the chief consideration.

By the 20th of May the ibises all appeared to be paired about Washoe Lake, although neither then nor a week later was I able to find their nests. Perhaps this was a little early for the deposition of the eggs, although the oviduct of a female shot June 3 contained a perfect egg.

ARDEIDÆ—Hérons.

ARDEA Linnæus.

A. herodias L. Great Blue Heron.

A common summer inhabitant of this whole region.

HERODIAS Boie.

H. egretta (Gm.). Great White Egret.

Colonies of this species reside in summer on many of the lakes which lie at the foot of the mountains in Eastern California and Western Nevada, while we learn from Captain Bendire of an extensive heronry as high to the north as Lake Malheur, Oregon.

Warner Lake, just within the southern borders of that Territory, forms a favorite resort for several species of the heron family. The white egret unites with the others to form colonies that build their nests in the larger growth of willows along shore.

Visiting such a heronry in September I found a dozen or more of the partially fledged young swinging by the necks from the crooked branches where they had evidently fallen as they clambered about the nests, and perishing miserably had hung till converted into mummies by the dry winds.

GARZETTA Kanp.

G. candidissima (Jacquin.). Little White Egret.

Observed at several localities in Nevada and Eastern California where it is not so common as the preceding.

NYCTIARDEA Swainson.

N. grisea naria (Bodd.). Night Heron.

Perhaps the most abundant of the family, and present in all the marshes.

BOTAURUS Stephens.

B. minor (Gm.). Bittern.

A common summer visitant as far north as Southern Oregon, reaching perhaps into Washington Territory as it does to Puget Sound on the coast. (Cooper.)

GRUIDÆ—Cranes.

GRUS Linnæus.

G. canadensis (L.). Sandhill Crane.

These large birds are numerous in so many portions of Nevada, California, and Oregon that it is scarcely worth while to particularize localities.

They breed in many of the sub-alpine valleys, where are found meadows of sufficient extent to afford both food and protection, and to these and the tule swamps they mainly limit themselves and the young till the latter are able to shift for themselves. In some localities where such resorts are not available, an occasional pair of old birds may be seen accompanied by a young one or two feeding on the grassy plain or open stretches of valley, where plenty of food is found in the shape of grasshoppers. Let once an Indian catch sight of one of these families and he makes short work of the young birds, which are readily secured from horseback, or even run down afoot.

Towards fall the cranes become more numerous, or, at least, more conspicuous, and in the region mentioned form a part of everyday scene, as in small companies they feed about in open view or fly in long lines from one valley to another, uttering their indescribably odd notes.

I know of no other bird that carries its instinct of caution to so great an extent as does the crane; and he must be careful indeed or greatly favored by fortune who obtains a shot at one.

The crane is usually held to be delectable fare; but my own experiments upon them, as served up in camp style, have not been entirely satisfactory, and I have found them tough and somewhat too gamey to bear the test of even a mountain appetite.

RALLIDÆ—Rails.

PORZANA Vieillot.

P. carolina, Cab. Carolina Rail.

Found throughout the summer, but apparently not so common as the succeeding species.

RALLUS Linnæus.

R. virginianus (L.). Virginia Rail.

Numerous about all the marshy lakes.

FULICA Linnæus.

F. americana (Gm.). Coot.

An extremely abundant summer resident of all the lakes, large and small, of this region.

They begin to build, about Washoe Lake, Nevada, the middle of May, at which date but few eggs had been laid, the majority of the pairs being still engaged upon their nests.

Their nests and nesting habits are too well known to need description here. A clutch consists of from seven to twelve eggs. The latter number, however, is very exceptional, nine being perhaps the average nestfull.

ANATIDÆ—Ducks, Geese.

CYGNUS Linnæus.

C. americanus, Sharpless. Whistling Swan.

The swans are among the latest migrants from the north, and hence come too late to fall under observation of our field parties.

With the approach of cold weather they occur in most or all the large lakes of this region, as well also upon many of the large streams.

It is certain that the above species occurs as stated, and, in all likelihood, the *C. bucinator* is also found at the same time.

ANSER Linnæus.

A. gambeli (Hartl.). Speckle-bellied Goose.

Towards the last of August in Northern California this species began to arrive from the north in considerable numbers. It becomes very abundant at a somewhat later date.

A. hyperboreus, Pall. Snow Goose.

Arrives rather later than the preceding, and perhaps in rather fewer numbers.

The Chen (*Chen Rossi*) has been found by Captain Bendire at Malheur Lake, Oregon, and in all probability is of regular occurrence as a migrant on the interior chain of lakes. The past winter (1878-79) it has been exceptionally numerous in the Sacramento Valley and along the coast.

BRANTA Scopoli.

B. canadensis (L.). Canada Goose.

The extensive lakes of Western Nevada, Eastern California, and Oregon, afford summer haunts for many of the Canada geese, or honkers, as they are popularly called, to distinguish them from the smaller Hutchins' goose and the "speckle bellies," neither of which birds remain in summer within our boundaries.

The nesting season of the Canada goose is well nigh over ere others of the feathered tribe, save perhaps some of the *Raptores*, are thinking of beginning, and the deposition of the eggs takes place in this region as early as February. Their mode of nesting is various. At Pyramid Lake the islands are extremely rocky, and here the geese build either under bushes along shore or resort to spaces underneath overhanging cliffs, or even to hollows in the rocks that form slight caves. Another and perhaps the most usual location for the nest is on the sandy spits of islands. The wariness which characterizes this goose, as to a less extent the other members of the family, undergoes no relaxation at this season, but, if anything, is increased. The spot selected to receive the eggs must be secure from all chance of intrusion—hence their partiality for islands; and as soon as the young are able to take to the water they are guided to some safe feeding ground, usually in the shallow water along some solitary shore. This care is rendered the more necessary, inasmuch as a long period must elapse for the young to receive their full powers, and they obtain nearly the size of the old birds ere their pinions are sufficiently developed to raise them from the water. Not infrequently, when riding along the rarely-visited shores of the lakes in the remoter districts, our parties have come suddenly upon these families of half-grown goslings, but rarely indeed ere the watchful parent had caught the alarm and had urged her convoy to a safe distance from the shore. Their food is now obtained wholly from the water, and not until the young have passed quite out of the gosling stage and have become fully developed in every respect do old and young assemble into flocks or "gaggles," and their visits to the stubble fields and pastures begin.

The birds that breed in this region start southward at a period nearly coincident with or a little before the arrival of the full flocks from more northern grounds. Just prior to setting out they are in the best condition, being fat and juicy from their mingled fare of grain and tender grass shoots.

ANAS Linnaeus.

A. boschas (L.). Mallard.

One of the best known, as also one of the most highly esteemed, of all our ducks, its extensive range and great abundance wherever found, entitles the mallard to a place in the front rank of our valuable food-birds. In the West, as a table bird, it takes precedence, I think, of all others, its very general habit there of feeding upon grain for a part of the year conducing to its excellence of flavor.

In the region our report covers it is very numerous, not only during the migrations, but also in summer, when large numbers remain to breed about the various lakes. For this purpose it resorts to precisely the same localities as the red-breasted teal, viz, the partially submerged marshes; although, in truth, but little change of locality is in case of either of these birds necessary, since their tastes lead to the choice of similar places all the year round. So much alike, in fact, are their habits of nidification that during a day's hunt I have found many nests of the mallard alternating with those of the teal, and in many instances the nests of the two were but a few feet apart.

The mallard begins to lay during the last days of April and the early part of May, and by the 23d of the latter month I found several nests in which the eggs were far advanced, while in one the ducklings had appeared.

The mallards place their nests much as do the teals, but are, perhaps, more inclined to seek out standing tufts of dried rushes, doubtless because in them they can more readily conceal their bulkier bodies; at the base of these they have no difficulty in forming a safe and commodious retreat. At first, and in the majority of cases, little attention is paid to the nest proper, and a slight collection of dried rushes and grass, sufficiently hollowed to contain the eggs and the body of the bird, is all that is required. The lining of soft down, plucked from the breast and belly of the devoted female, is deferred till later, it rarely being found till the complement is nearly completed, and it more frequently still being left until the eggs have been incubated for a considerable period.

I have never found more than ten eggs in a nest, though I have seen broods of eleven under convoy of the parents, and perhaps the full dozen are sometimes laid.

When disturbed the mallard rises heavily from its nest, its fright occasionally compelling a volley of loud quacks, while at other times it flies away in perfect silence. In

case of the female, she may then show her concern by flying in wide circles near the nest; and this she is especially likely to do when the maternal instinct has become strong by long brooding. But should the nest contain only a few newly-laid eggs, much less apprehension is displayed, and then she flies straight away to remain in hiding for some hours, or until completely reassured. Often, under the latter circumstances, the nest is never reoccupied, but a second begun after a delay of twenty-four hours or so.

Soon after being hatched, the downy young are led by their parents, not into open water, where would follow a well-understood danger from hawks and other enemies, but into the shallow inlets, where they can be screened by the heavy covert of reeds; and they are not allowed to venture out of these until able to shift for themselves. I think that for the first few nights after being hatched the tender young are led back and brooded in the nest. But the interval during which the young are most exposed to danger is in the "flapper" state, or when they have attained considerable size, but have not yet received the power of flight, for the rectrices, as is well known, are the last feathers to be developed. They now flap along the surface of the water in a curious sort of way, half flying, half swimming, and when cornered in shallow water, as may often be done, they fall easy prey. This is the accepted time of feasting for numerous species of hawks, not to mention such formidable four-footed enemies as coyotes, foxes, etc., while most to be feared of all is its human foe in the shape of the Indian. Armed with clubs, the boys and squaws enter the shallows, and by beating the reeds drive the young before them till they are congregated in some favorable spot, when they are slaughtered by the scores. I have seen Indians returning from one of these ducking expeditions fairly loaded down with spoil, the young ducks hanging by the necks in festoons, and almost hiding by their numbers the dusky bodies of their slaughterers. Ducks' eggs and ducklings form in fact during summer no small part of the Indians' fare.

Probably none of the mallards raised in this region pass the winter here, but migrate south, and are replaced by more northern-born birds, so that about the numerous warm springs and ponds of open water the mallards are to be found throughout cold weather, until spring once more impels them northward.

DAFILA Leach.

D. acuta (L.). Piu Tail.

Abundant during the migrations; one breed.

CHAULELASMUS Gray.

C. streperus (L.). Gadwall.

This fine duck breeds abundantly throughout this region.

MARECA Stephens.

M. americana (Gm.). American Widgeon.

Breeds more or less commonly in this region; most abundant as a migrant.

QUERQUEDULA Stepheus.

Q. carolinensis (Gm.). Green-wing Teal.

Scattered pairs of this teal breed over all this region, and in some localities it is doubtless numerous.

While crossing the desert north of Reno, early in July, we found in the solitary pool of water, which with its scanty growth of green rushes forms the only oasis for miles around, a family of this teal consisting of a female and ten young. The pool being of too small extent to furnish shelter in such danger, the mother bird led the band to the shore and directly into the sage-brush, into which they dived and hid as though fully alive to the emergency of the case.

This teal is most abundant as a spring and fall migrant, its proclivities hence being for more northern summer grounds.

Q. discors (L.). Blue-winged Teal.

This species was not seen at all during the summer; nor, as a migrant, does it appear to be as numerous in this region as either of its congeners.

Q. cyanoptera (V.). Cinnamon Teal.

This teal is one of the few ducks whose range is so far circumscribed that it may be spoken of in general terms as a western species, the area occupied by it, even during the migratory seasons, not extending to the east of the Rocky Mountains, except in

Texas. Although noted from Louisiana, its occurrence there is presumed to be quite accidental. It furthermore appears as a summer resident in almost every section where it is known at all. It breeds about the Columbia River, at present its northernmost recorded limit. Southern Colorado, on the other hand, as determined by our parties, is included in its summer range, as possibly also Arizona and New Mexico, although of the latter fact no absolute proof was obtained. In many localities in the intermediate regions it is one of the most abundant of summer visitants, and in no place more so, according to my knowledge, than in Western Nevada and the contiguous regions.

It makes its appearance on the lakes of Nevada early in the spring, at a date nearly coinciding with the general impetus northward to be observed in the ducks and water birds generally. At the time of my first visit to Washoe Lake, May 12, all of the teal appeared to be paired, while not a few had so far progressed in their housekeeping matters as to already have eggs.

With all the ducks there is noticeable a great variation in the time of nesting, even at the very same locality. The cinnamon teal forms no exception to this rule, and from the above date onwards I found nests in all the various stages of advancement. Fresh eggs were found as late as the 1st of June, although most of the nests at this date contained either young or eggs very far advanced. Perhaps a certain proportion of the late breeders are to be accounted for on the supposition of the destruction of the first nests, for ducks have many enemies at this season; and fresh duck-eggs as well as young birds have an especial attraction for all the smaller carnivores.

The teal's nests will be found scattered over a marsh at large, their chief care being to secure a dry spot out of reach of the danger of inundation, which is their principal risk, and the cause at times of the destruction of great numbers of the eggs. Some seasons of high water about Washoe Lake, as I was told by the ranchman, prove most ruinous to the first clutches, and the swollen inlets of the marsh have been observed at such times to be fairly dotted with eggs of the various kinds of ducks, which had been floated off by the rising waters.

An apparently secure locality found, a pair soon satisfy themselves with some special little nook. They never, I think, build in the heavy beds of tule, but either select an isolated bunch of rushes, or else place the nest in the midst of the short waving marsh-grass, where it is sufficiently thick to protect the setting bird from ordinary observation. Occasionally, too, they nest upon the dry land under a bush, and more or less distant from water. But in any event the nest must be within easy reach of a good feeding ground, and is usually not many yards, perhaps but few feet, distant from some pool or stream. Ducks have plenty of opportunity for the exercise of cunning in their domestic arrangements, and some of the pairs display infinite address in hiding their nests, and the eyes of the most observant collector, be he two or four footed, will often in vain scrutinize the very clump of grass wherein is hid the mother bird nesting close down to her treasures, secure, till a blundering step starts her from her charge. If a clump of rushes be selected as a nesting site, the bird enters from the side through a space so small that, once inside, it needs but a few slight touches of the bill to replace the stalks disturbed by her entrance, and restore everything to its natural appearance. And this the female is knowing enough to do, as she is also to carefully cover the eggs during her temporary absences. Like the mallard, and probably most if not all other ducks, the cinnamon teal is very indifferent as to the state of the nest at the time the first eggs are laid, and leaves the final touches till towards the period when the young are about to appear. Then, to provide a soft bed for her offspring, the female quite denudes the under portions of her body of its downy feathering, and with the material obtained in this way warmly felts the nest.

The teal is a close setter, and the female will occasionally prove so devoted to her charge as to permit herself to be caught by hand. If the young be out, there is scarcely any limit to the hardihood she will show in her attempts to distract attention from them. She flutters along the ground just beyond reach of the outstretched hand, and resorts to every effort of dissimulation likely to induce pursuit. I have seen the wounded, broken-winged bird, in particular, imitated so cleverly by this teal, that it was difficult indeed to persuade myself that it was a cheat.

The extreme number of eggs at a hatching is, I believe, twelve; and in some thirty nests examined at Washoe Lake this number was found only twice; nine, ten, and eleven being the more common complements.

In fair seasons the greater number appear to be hatched out, as I never saw a small brood; and occasionally every egg proves fertile. That this should be the case seems a little remarkable, when is considered the irregularity which marks the intervals of deposition.

When newly laid the eggs are of a beautiful, soft, creamy white, and the texture of the shell is delicate and a trifle rough under touch. Very soon after the full complement appears the shell becomes smooth and shining from the constant contact and rubbing of the bird's body, and the delicate texture is lost entirely. The color is also correspondingly changed, and now appears as a light buff, which darkens and stains

as time goes on. Such are the usual museum specimens. Their exact shape is somewhat indeterminate, since, in the sets before me, many approach the true ellipsoidal, while others are simply oval in varying degree; some are elongated and quite pointed at the smaller ends; others are blunt. It is to be remarked that the peculiarities of size and shape are apt to obtain with but slight variations throughout the whole of a set. The two smallest eggs before me measure 1.88×1.27 , and 1.82×1.32 ; and from this extreme they run up to 2.10×1.37 .

The cinnamon teal is, in the interior, one of the very first of the ducks to start in fall on the southward migration, and, in the neighborhood of Washoe Lake, nearly all have left by the first of September; while those that breed farther north are not long in following. In California it remains later, and I understand from my friend, Mr. H. G. Parker, that more or less winter in the Sacramento Valley.

SPATULA Boie.

S. clypeata (L.). Shoveller.

This duck is abundant in fall and spring in nearly all portions of the West. Nevertheless if it remains to breed, it does so apparently only in rare instances, except along our northern border, as in Dakota, where the young were found by Dr. Cones in August.

It is true that I detected the species at Washoe Lake in June. But upon killing a male the cause of its stay so far south was revealed in the shape of an old wound; probably, too, a greater or less number of barren birds are scattered over the lakes of this region.

FULIGULA Stephens.

F. marila (L.). Greater Blackhead.

Numerous only as a migrant and winter visitant.

F. affinis Eyton. Lesser Blackhead.

Occurs as the preceding.

F. collaris (Donov.). Ring-neck Duck.

In noticing this species on previous occasions, especially in the report for 1876 I have given it as breeding in Utah, Nevada, &c. I was led into what I now am convinced was a mistake by the incorrect identification of several young birds. These I now ascertain to have been the young of the redhead (*F. americana*), as similar specimens taken the past season of unquestionable identity show. I take this occasion therefore to make the correction, and all such references are to be understood as applying to the redhead, and to it alone. We have no proof at the present, so far as I am aware, that the ring-neck breeds within our limits, and it doubtless retires in summer to points far beyond our boundaries. During both spring and fall it occurs in greater or less numbers according to locality.

F. ferina americana (Eyton). Redhead.

Better known, perhaps, as a bird of the east coast, the redhead is yet a well-represented species on the west coast, and also to a somewhat less extent of the western interior. It was found breeding, though not in great numbers, about Washoe and other lakes in Western Nevada and the contiguous portions of California. This is, I believe, a summer range much farther south than is usually understood to apply to this species; although young birds taken at Rush Lake, Southern Utah, by myself, affords good evidence of its summer residence at that point.

Its method of nidification is in general much like the other species. One nest found by Mr. H. G. Parker was somewhat singularly placed, in that it was built in perfectly bare, open ground. A hoof-track in the mud, which had subsequently been left high and dry by the receding waters, received the nest, composed in this instance entirely of feathers and down, there being, in fact, no room in the narrow quarters for other accumulations. A second was built close to the water's edge under protection of a little clump of grease-wood bushes. The eggs numbered in these instances respectively five and seven, incubation in neither having begun.

I append the measurements of three of the first set, merely remarking that, except for their more spherical form and perhaps rather larger size, they would be indistinguishable from the mallard's: 2.23×1.73 , 2.21×1.73 , 2.17×1.70 .

BUCEPHALA Baird.

B. clangula (L.). Common Golden Eye.

An abundant migrant.

B. albeola (L.). Buffle-head Duck.

As preceding species.

PELECANIDÆ—Pelicans.

PELECANUS Linnæus.

P. erythrorhynchus Lath. White Pelican.

The white pelican is less known from its occurrence on either coast than from the abundant numbers that inhabit the great interior lakes. From their great extent, and in many instances complete isolation, as well as their containing an abundance of fish, the lakes of Nevada, California, and Oregon are especially favored by this bird, and on certain of them, as Pyramid, Eagle, and Goose Lakes, the pelicans are found in summer in immense numbers.

So much has been written from time to time upon the breeding habits of this species, that most persons interested in the subject may be presumed to be pretty familiar with them, and this part of the bird's biography need not be enlarged upon here to any extent.

Naturally the white pelican seems to be rather stupid, and, when the privacy of a breeding colony is encroached upon for the first time by a human being, the liveliest feeling his presence is apt to excite is intense curiosity, which is occasionally carried to such an extent that the birds appear as though too completely overwhelmed with astonishment to take any special precaution for their own safety. Under such circumstances they may occasionally be so closely approached as to be killed with clubs. No creature however so dull as not to profit by the lessons that experience teaches, and the treatment the pelican usually receives at the hands of man is of such kind that in him they soon learn to recognize an enemy to be feared and shunned on all occasions. Such is the case at Great Salt Lake where the former great abundance of the pelican is attested by all the early explorers, but where now the bird is known only as a casual visitant. Persecution is having a similar result at Pyramid Lake, Nevada, where a few years ago the birds were so tame as to permit themselves to be almost caught by hand. At present, though still abundant, they are excessively shy having been driven entirely away from certain of the islands by treatment which must eventually cause their complete disappearance.

From its large size and conspicuous plumage, and the habit of colonization at the nesting period, added to the complete exposure of the eggs upon the sands, and finally from the fact that the young when hatched are perfectly helpless for a period of over a month, the pelican is peculiarly exposed to the assault of its enemies. From four-footed foes it secures immunity by nesting upon islands, a precaution which, of course, proves of no avail from its human persecutors.

At Pyramid Lake a crusade has been inaugurated against the pelicans by the fisherman, whose cause is justified in their own eyes by the voracity of the big birds, and the number of fish consumed by them. In a single day, as I was informed, over 700 eggs belonging to one colony were destroyed. This complaint of injury done the fishing interests is not, it must be said, without some foundation. The number of pounds of fish consumed in a day by the combined numbers of a large colony of pelicans, especially when feeding young, must amount to something fabulous. As a rule, however, and from the nature of the mode of fishing practiced by the white pelican, fish of value, as the trout, are but little exposed to their attacks; the species they are able to obtain consists chiefly of the smaller fry found in shallow water, and of little or no table-value whatever, their principal, if not their only, importance being as food for better kinds. As this small fry fairly swarms in all the western lakes, there is no danger at present, at least, that the fishing interests will be injured in this indirect manner, as indeed is plainly evidenced at Pyramid Lake, where, despite the number of the pelicans, trout exist in enormous numbers.

The method of obtaining their prey by banding together, driving the fish before them into shallow water and then scooping them up with open bill by means of quick rushes, I have often witnessed and is well known. The large size of the fish a pelican, under emergency, is able to dispose of, is somewhat surprising. I once saw a bird which had been wounded, and which was apparently unable to clear the surface of the water, throw up a sncker which I estimated to weigh not less than three pounds. Having rid itself of extra ballast to this extent, it flew away with ease.

The deposition of the pelicans' eggs takes place at a very early date; the colony at Pyramid Lake, as I learned, having laid many eggs by April 10, and this is I think about the usual date. As might be presumed, all the pairs of a colony do not begin laying at the same time; in fact there is much irregularity in this respect, and as a consequence there results a corresponding difference in the time of appearance of the young. This was clearly shown in the case of a community of from 500 to 1,000 pairs that had established themselves on a sandy island in Eagle Lake (Cal.), and which I visited July 4. At this date the young were present in all stages of growth, from the chick just breaking the shell to the youngster fully grown, but still unable to fly. A

rough estimate placed this number at considerably over 1,000, and a more incongruous assemblage was never witnessed. As our boat approached the island the parent birds began to manifest some uneasiness, and when we were about two gunshots away they rose *en masse* and settled in the water at convenient distance for watching our proceedings. The younglings were considerably flustered when they found such strange creatures among them, and treated all our advances with marked disapproval. Forming into solid phalanxes of all sizes, they shuffled over the sands, the ranks opening to right and left with all alacrity according as we directed our steps. The appearance they cut as they waddled about on their unsteady legs, some of them almost naked and all ngly and uncouth, was ludicrous in the extreme. Even the older ones made no attempt at aggressive resistance when captured, but were content to show their repugnance at being handled by violent efforts to escape from our hands. Finally, in response to the coaxing of a few old birds that ventured in, many took to the water, and, having swam out three or four hundred yards, remained quietly eyeing our movements with all unconcern. Many gulls and several pairs of cormorants and great blue herons shared the island with the pelicans, and their young afforded living proofs of the unruffled tempers and good dispositions of the big birds.

At this lake the pelicans presented a peculiarly noteworthy sight as at intervals during the day they spread their broad wings and flew in bands of from five to fifty to the neighborhood of some one of the lofty peaks within a mile or two, where they amused themselves by sailing about for an hour at a time in the invigorating air and in encompassing the summits in wide circles. Their snowy-white plumage reflected the bright sunlight, and the huge birds appeared at their best as they soared above cañon and forest at such height that all ungainliness of form was lost and we were left to admire the snowy purity of their colors and their fine powers of flight.

The "centre-board," so called, a horny excrescence appearing on the bills of the adults about the mating period is, as has been shown by Captain Bendire, common to both sexes. This is shed as the season progresses, till, in early July, when the young are usually well advanced, it is rarely seen, although a few still persist at this time. Of its use nothing appears to be known.

GRACULIDÆ—Cormorants.

GRACULUS LIMBÆUS.

G. dilophus (Sw.). Double-crested Cormorant.

The cormorants from this region have usually been referred to the variety *floridanus*, a name bestowed upon what was supposed to be a small southern race of *dilophus*. But my pair of specimens taken at Pyramid Lake, Nevada, in summer, are fully up to the requirements of size of *dilophus*, and I therefore so consider them. It is to be remarked, however, as has been indicated by Mr. Ridgway, that specimens occur in the region under notice, and in California, that are no larger than many Florida born birds. After examination of the Smithsonian material I am of the opinion that the alleged difference of size is of too doubtful applicability to warrant the recognition of this variety.

The double-crested cormorant is more or less numerous on many of the lakes of this region, its abundance at any given locality being chiefly regulated by the presence and character of nesting facilities.

All the nests examined by me were built in depressions and cavities on rocky islands, although in this same region they build upon trees, as fully attested by Mr. Ridgway. The nests were composed chiefly of sticks with a substantial lining of weeds. One was noticed that had an additional slight felting of feathers. No birds could well be less fastidious in regard to their nesting arrangements than they, and the foul odor about a cormorant rookery is almost unendurable. Entangled in one nest that I examined was the mummied head and neck of a brother cormorant that apparently had been gathered as available nest material.

Although the flight of the cormorant appears heavy and somewhat laborious, it yet progresses from feeding ground to feeding ground with tolerable ease and much swiftness. But the bird appears at its best in the water, where it is scarcely less at home than the typical divers, and where no little of its existence is passed beneath the surface in pursuit of its finny prey. This the cormorant never plunges for, but, like the grebes, divers, and other birds of that class, the best swimmers of all, captures it in full chase. The bird's forays are usually made into large schools, and apparently it has very little trouble in procuring all it requires. The cormorant is not always successful in holding a fish after it has fairly seized it, and at Eagle Lake there were to be seen in every school of white-fish (*Coregonus williamsoni*) a considerable number that bore across their bodies the marks of the powerful mandibles. I found quite a number of sizable fish that had escaped from the birds' bills, only to die a lingering death from the effects of compression.

LARIDÆ—Gulls, Terns.

LARUS Linnaeus.

L. californicus Laur. California Gull.

The present species is to be distinguished from the *L. delawarensis*, which it somewhat closely resembles, by the following characters:

L. californicus, adult—size larger; bill stouter; (wing, 15.43; tail, 6.24; bill, 1.82; depth above notch, .60; tarsus, 2.23).*

Mantle dark pearl blue, much darker than in the succeeding. Color of bill (in fresh specimens, sometimes retained in skins) bright yellow, with an irregularly shaped spot of intense carmine near tip of lower mandible; a spot or bar of black anterior to this on both mandibles. Iris hazel or brown; tarsi and feet pale green.

L. delawarensis, adult—size smaller; bill less robust; (wing, 14.49; tail, 6.06; bill, 1.45; depth above nostril, .51; tarsus, 2.07).†

Mantle pearl blue, always lighter than in preceding. Bill greenish yellow, encircled near tip by a broad black band. Iris light yellow; tarsi and feet Naples yellow.

The amount of black on the bill of *californicus* is variable. Usually it takes the form of spots or bars, as given above, but such is by no means always the case. Not rarely, as in several adult specimens before me, it appears in the form of a complete circle as in *delawarensis*. In such cases, however, the ring is much narrower than in that bird. More rarely the black is almost or quite obsolete. Similarly, or even more variable, is the amount of white at tip of first primary. In a majority, perhaps, of specimens this is found as a terminal patch of about two inches in extent. Some individuals, however, apparently perfectly adult, have the tip and shaft black for three-fourths of an inch, the white being restricted to a spot on either web above the black area, almost precisely as in *delawarensis*. Others, again, may have the extreme tip white, above which is a band of black including both webs and the shaft, and giving way, higher up, to a second white area which may or may not include the shaft; sometimes, indeed, the shaft is black above and white below. Hence the spotting of the primaries and the black markings of the bill, points upon which considerable stress has been laid by some authors, are too inconstant to prove reliable guides in diagnosis, although not entirely without value.

In fall the adults of either species have the white of head more or less spotted or streaked with dusky. The carmine spot on the bill of *californicus* fades away, as also the crimson of eyelids and at angle of mouth, which is common to both species. The differences in size, especially of bills, and the color of the mantles may now be relied upon to separate them. To distinguish young birds, which always exhibit so much individual variation, becomes much more difficult, and I have found the size of bill to be the best and most constant feature.

The Californian gull is found as a very abundant summer resident throughout the entire chain of lakes, and is, so far as I can learn, the only representative of the family present here at this season. Upon stretches of sand, jutting out from the little islands in mid-lake, or occasionally among the rocks along shore, this gull constructs its nest, and deposits from two to four eggs about the middle of May. The nest is a somewhat rude and bulky structure, particularly if it chances to be placed in rocky interstices, and is composed of weeds, sticks, and similar coarse material gathered from the shores, and lined more or less substantially with finer gleanings.

The colonies are, as a rule, very large, one that I visited on Pyramid Lake containing several hundred pairs, and the nests occupy every available spot on the sands. Unfortunately for the gulls, the eggs are rich and sufficiently well flavored to be a welcome addition to the meager fare of the settler, and hence, when accessible, are eagerly sought for. The colony alluded to above had been visited every few days for a period of more than three weeks, and every nest rifled. But so tenaciously do the birds cling to a spot that has once been chosen as a nesting ground that many still continued to deposit eggs, sometimes in newly-constructed nests, but often in the plundered ones. Many of the females had laid so often that the coloring pigment had been exhausted, and, as a consequence, a considerable portion of the later eggs were almost unspotted. The eggs of this gull are so nearly like those of the ring-bill as to be practically indistinguishable, although they average a trifle larger. In the exact style and amount of markings they vary interminably.

L. delawarensis (Ord.). Ring-bill Gull.

Given by Captain Bendire as a "common summer resident" of Malheur Lake, Oreg. It is possible that a mistake has been made here, and that the statement really applies only to the *L. californicus*. If correct it furnishes us with the only instance of the bird breeding within the United States. Upon all the other lakes in California and Nevada

* Average of four specimens.

† Average of eight specimens.

that I have visited the ring-bill appears to be only a fall and winter resident, and as such is numerous.

STERNA LINNEUS.

S. forsteri (Nutt.). Forster's Tern.

Dr. Cones appears to have received an entirely erroneous impression in regard to the breeding range of this species, and assigns the interior of British America as its summer home, implying in his article in *Birds of the Northwest* its entire absence from the United States at this season, although he intimates a possibility of its being yet found to nest on or along the northern tier of States. The truth is this tern is an extremely abundant summer resident of Washoe and other similar lakes of Nevada and California east of the mountains upon which are found any considerable extent of tule or other marsh. It also occurs abundantly in summer in the great fresh-water marshes in the vicinity of Chicago, and also in Wisconsin. Upon the eastern coast its summer range is somewhat erratic, as it appears to be wanting along the New England coast, but is found at this season, in great numbers, on certain of the islands off the shore of Virginia and to the southward. Its absence farther north is, perhaps, to be accounted for from the lack of suitable localities, since the Forster's is as much of a marsh-loving species as the black tern, in contradistinction to the Wilson's, arctic, and others, which habitually frequent the open water, or, at least, avoid more the sedgy marshes.

Upon the western lakes the Forster's and black terns mingle fraternally together as they conduct their search for food over the broad expanse of oozy marsh or along the shallow, reedy shores. Moreover, the Forster's tern, instead of building on the open sands, has recourse to the marshes, thus still further following the habit of the black tern.

The single nest found by me consisted of a few bits of *débris*, and was placed on a muddy bank by the side of a ditch of running water.

HYDROCHELIDON BOIE.

H. fissipes (L.). Black Tern.

This species, which is a well-known inhabitant of our lakes both east and west of the Mississippi, makes its appearance in Nevada early in May, and by the 10th of the month is very generally dispersed.

A bird of the sloughs and reedy marshes, wherever found, its habits differ in but few and unimportant particulars. The character and extent of its nest vary somewhat with the locality it inhabits. Thus Dr. Cones tells us that it builds no nest of its own, but finds the matted *débris* of weeds a sufficient protection for its eggs, while Mr. Nelson's experience near Chicago was in effect that it invariably builds a substantial nest of its own, whatever the foundation may be. In one particular the custom of the species, wherever found, seems to be very uniform, namely, for all the pairs in a given locality to adopt the same plan, which is naturally determined by surrounding circumstances. In Nevada the method of nidification appears to be various, the nests in some neighborhoods being placed among the waving grass in a tolerably dry situation; in others, on firm tussocks; in others still, on beds of matted tules. In any event the formation of a certain amount of material of the bird's own gathering into some sort of a nest seems in this region to be the rule. I may note here some curious nesting sites selected by a large colony of these terns, which had established themselves in a slough that contained enough open water to form the home of numerous grebes (*P. auritus californicus*): The nests of the grebes, from which the young had departed not long before, had been utilized by the terns, and hasty gatherings of bits of dried rushes and the like had been placed upon the half-decayed and wholly filthy masses to receive their eggs. The utter lack of fastidiousness of the terns was further exemplified in the fact that in nearly every case their own eggs lay in close proximity to the rotten and abandoned eggs of the first occupants. In fact, in one or two instances the terns must have found it difficult to incubate their own eggs without partially covering one or more of these. At this date (July 24) some of the eggs were in the advanced stages of incubation, while others had been hatched. The most vociferous of the family under every-day circumstances, such an occasion as the present is sure to call out all the bird's powers of noisy vituperation. The cries of the parents as they flew close down to the nests had the desired effect of causing the young to hastily abandon the nests and seek shelter in the grass. One old bird that was sitting on an egg from which the bill of the imprisoned chick was just escaping refused to leave her charge at this critical juncture, and actually permitted me to approach in plain sight and take her in my hand.

Fish forms an unimportant item in the bill of fare of this species, as, unlike others of the family, it feeds in great part upon insects, which it takes in various ways, mostly as they fly from the grasses.

The species is present in Nevada during the latter part of August in somewhat diminished numbers, but in September all leave for the south.

DESCRIPTION OF NESTLING.—Head above smoky brown, the same color prevailing below, but becoming darker across the jugulum and lighter on abdomen; sides of head and loreal region white; back and sides of body pale cinnamon brown, interspersed with irregular patches of black; bill black; feet brownish.

COLYMBIDÆ—Divers.

COLYMBUS Linnæus.

C. torquatus (Brunn.). Great Northern Diver.

From information received from various sources I had been led to consider this diver as of rather uncommon occurrence in the waters of this region. During the past season, however, it was met with several times on Eagle Lake, Cal., where a number of pairs breed regularly, and the same is true, I think, of Goose Lake, where, at any rate, the species was observed by our party during the late summer.

PODICIPIDÆ—Grebes.

PODICEPS Latham.

P. occidentalis (Lawr.). Western Grebe.

None the less striking because familiar is the appearance of this large grebe as seen upon the extensive lakes of Nevada, and the country generally west of the Rocky Mountains. At what time in the spring it makes its appearance in these latitudes I do not know. On the occasion of my first visit to Washoe Lake about the middle of May the water was dotted with water birds, and conspicuous among them, as well by its elegance of form as by its graceful motions, was this grebe. Subsequently, when in turn I visited the several lakes lying to the northward, I found it an abundant inhabitant of them all. Indeed, with the exception of Lake Tahoe, I know of no large body of water in the far West that is exempt from its presence. The high elevation of Tahoe, over 6,000 feet, probably accounts for the absence of the bird, as in all the other mountain lakes of less elevation I have always found it present in abundance.

There is a pretty close correspondence in the character of the food, the manner of obtaining it, and in the habits of nidification of the various species of this family, and my observations have not shown that the western grebe possesses any very marked individuality in these respects, unless such as arises from its great size and superior prowess in manner of obtaining food. The largest of our species, the present bird excels all the others in natatorial powers, and in its ability to remain a long time submerged, in which particular it almost rivals the loon. It is probable, therefore, that this grebe is able to avail itself of its remarkable powers in the capture of fish, and it hence lives more upon them than do the other smaller and less powerful species. But fish do not, I think, form by any means its principal diet. The larvæ of all aquatic insects, various worms and leeches, as also some kinds of aquatic plants, make up its chief dependence.

The western grebe is a wonderfully quick diver, as I have had occasion to learn when after specimens, and I have found it almost impossible to kill the old and wary birds even at very short range, provided the bird was not taken unawares and could see the flash of the gun. However true the aim, and whatever the precaution as to the place aimed at, the leaden pellets when they reached the spot found only empty space, where a moment before was to be seen the long, snaky neck of the cunning diver.

It is about the 1st of June when the various species of grebes begin to think of their domestic duties, and if they be watched now they will be found to have gathered together into loose companies, which are to colonize together later on, and to spend much of their time in swimming back and forth in a rather excited manner just off one of the many clumps of tules that grow around the margins of most of the western lakes. The shallow depths about such form, it is true, favorite hunting grounds at all seasons, but around the comparatively few spots that possess the necessary qualifications for nesting purposes the concentration of the birds will be more marked as well as more persistent. The thicker tangled recesses among the tules are shunned, and only those spots among the season's fresh growth selected, where the tall reeds, while affording ample protection as well from the waves of the open lake as from chance observation, will yet admit of unimpeded progress in swimming to and from the nest. Such a place found numerous pairs center in and form a sort of independent colony, and the preparations for the nest are leisurely gone on with. A few of the surrounding tule-stems are perhaps broken off or bent down, and other reedy material gathered and laid in a pile, the structure being ready for occupation when a slightly hollowed and homogeneous mass of this is raised so as to fully clear the surface of the water.

None of the many nests I have examined, either of this or the other species, have been moored as described by some authors. They have usually been perfectly free, except in so far as the reeds constituting a hedge about them offer a complete check to the chance of their floating off. Occasionally, it is true, a few of the surrounding stems have been bent down and made to enter into the composition of the nest. But this is rather rare, and is apparently to be looked upon as an entirely accidental circumstance, so far as any intention of anchoring the structure is concerned.

A less promising place to deposit eggs than the structure described can scarcely be imagined. The material, which is mostly gathered from the water, is muddy and soggy, and how it is possible to hatch eggs on such surroundings is a mystery to all but the grebes. The problem appears to be easy enough of solution to them, and solve it they do in a most satisfactory manner. I have never been successful in my efforts to catch sight of a grebe on its nest, and partly on this account, partly from the peculiar character of the nest itself, have been led to surmise that much of the labor of incubation is shirked by the birds of this family and is delegated to the warmth of the sun's rays, aided, perhaps, by the heat which arises from the decomposing nest material. Like other species, as the eared grebe, the present bird covers up the eggs in its absence, although occasionally I have found them exposed to view. I have never found more than four eggs to a nest of this species, but presume that this number does not represent the full complement.

The young begin to appear about the first of July, but many pairs at this date will be found to still be incubating. The chicks appear to leave the nest almost as soon as hatched, and their history at this early stage is full of interest. One need only push his boat through the tules at this season to find himself rewarded by the sight of some domestic scenes that will well repay his trouble, and will perhaps give him a higher idea of these birds of "low instinct" than is usually accorded them. The reedy recesses are full now of quaint noises, not heard at other seasons. The faint quackings of the young ducklings convoyed by their watchful parents, the harsh notes of the coots calling to their numerous progeny, the piping of rails, and the querulous sputtering notes of the ever busy marsh wrens, are blended into a common melody, that now swells into full chorus, now dies away into confused murmurs under the fitful midsummer's breezes. But notes, too, other than the above are to be made out in the confused gabble, viz: the high piping call of the grebes, and, if he manages adroitly, the observer will find himself directly in the midst of a family group or groups containing all the birds just mentioned. His appearance will be the signal for a hasty scattering of the startled community, but, whatever of the scene he may fail to take in, let him not overlook our grebe just now. At the first sign of danger the pair of old birds have warned the young, that respond with feeble pipings, and at the call placing themselves on the broad flat backs of their parents, who have ranged up alongside for the purpose they are transported to a place of safety. No more beautiful and touching sight can be imagined than that presented by the downy little creatures as they huddle close up to the old one's neck, and give themselves trustfully up to its protection. Both parents share equally in the care of the young, part of the brood accompanying one, part the other. In this manner, they are carried about from feeding ground to feeding ground, or removed when danger threatens. Even at this very early age the chicks, under emergency, are wonderfully adept at diving and swimming, and to catch one uninjured is a matter of no little difficulty.

A brief description of the young in the downy stage, hitherto undescribed, is subjoined. First stage: Body above, dark sooty brown, lightest along sides. Head and hind neck light ashy plumbeous, in contrast to the under parts, which are pure white. Bill black, extreme tip light yellow.

When about half-grown, and while still in the down, the young differ considerably from the above in color. The head above is then of a blackish brown, and the down on hind neck shows the same color at base. It would appear that the growth of down is continuous for a considerable period, the ends being constantly worn away by attrition, and that its color just prior to the replacement by the true feathering corresponds with that of the latter.

P. auritus californicus (Herm.). Eared Grebe.

This diminutive species appears to reach its maximum of abundance only as we approach the west coast. In Nevada, Oregon, and California, it is by far the most numerously represented of the family, and may be found at the right season on any and all the lakes and ponds of this region, where exist the proper nesting facilities. Though apparently absent in summer over much of the interior region proper, through all which, however, it migrates, it has been ascertained by Dr. Coues to breed abundantly along our northern frontier, as in Dakota, while on the other hand a sizable colony was found breeding in Southern Colorado, by myself. This may prove to be an extreme point in its summer range, but I think not, and that there is at least a probability of its occurrence still farther south, in Arizona.

Much of the account of the breeding habits of the previous species will apply equally.

well to the present bird. The nests are the same characteristic structures, the only difference being one of size, and the eggs are deposited about the same time. The habit, mentioned elsewhere, of covering the eggs with a perfect screen of weeds seems to be every where a constant one with the eared grebe, and I have never found a nest in which the eggs could be seen without first uncovering them.

Both parents share in the care of the young after birth, and, as in the case of the larger species, the young are carried about on their backs. The families are difficult to find at this season, as they rarely visit the open water, but keep sedulously within shelter of the tules, whence their shrill calls may be heard coming from all directions, and yet not a bird, young or old, be seen, unless extreme care be taken in approaching them.

The following is a description of the young:

First stage.—Head above black; a faint yellowish white line begins at base of bill, divides on forehead, and passes over either eye to hind neck; the latter is also streaked with white. Body above blackish brown; each down shaft tipped with ash; sides washed with plumbeous. Under parts rosy white.

As will be noticed, the young of this species differs sufficiently from the similar stage in any of the others as to be readily identifiable.

PODILYMBUS Less.

P. podiceps (L.). Pied-bill Grebe.

Although not nearly so abundant as the eared grebe, the "dabehick" is yet abundantly represented on the waters of this region in summer, and doubtless also to a greater or less extent as a resident species. The Pied-bill nests in the same localities as the eared grebe, and in the general particulars of habits the two agree closely.

The young of the present bird have very decided markings about the head, broad white and dark lines being contrasted alternately. On the back of the head are several irregular patches of bright rufous.

Gaylord Bros.

Makers

Syracuse, N. Y.

PAT. JAN. 21, 1908

