Mount Shasta
Annotated Bibliography

Chapter 32

Science: Zoology

The first zoologist to cross the slopes of Mt. Shasta was artist-naturalist Titian Ramsay Peale. He was a member of the 1841 Wilkes-Emmons overland expedition. His mammalogy and ornithology report, containing descriptions of the animals and birds of southern Oregon and northern California, was published in 1848 and is entered in Section 9. Early Exploration: American Government Expeditions, 1841-1860. Incidentally, Peale was the first to scientifically describe the "Mule Deer" and to do so he used specimens collected during the 1841 overland journey. In 1860 John Feilner, working for the Smithsonian Institution, studied the birds of the Shasta region. During 1883 and 1884 Charles Haskins Townsend roamed northern California. His Field Notes on the Mammals, Birds, and Reptiles of Northern California, published in 1887, contains some of the most interesting of early naturalist accounts of Mt. Shasta. Among other things Townsend writes about the unexpected company of a bald eagle on the summit of Mt. Shasta. The Division of Biology of the United States Department of Agriculture sent scientist C. Hart Merriam to Mt. Shasta in 1898. Merriam's report, entitled Results of a Biological Survey of Mount Shasta, California, was published in 1899 and is a classic of Mt. Shasta science. (The Division of Biology later became the U. S. Department of Fish and Wildlife.)

By the late 19th Century Mt. Shasta's Big Horn Sheep, Grizzly Bears, and Elk had been eliminated through predation and disease. These largest of Mt. Shasta's creatures, for which the mountain and the region were at one time well-known, have never come back. For first-person Mt. Shasta accounts of these not-so- long-gone great creatures, see the writings of Joaquin Miller and John Muir in Sections 20 and 21 of this bibliography. In the 20th Century very few zoological studies specifically about Mt. Shasta have been published. One interesting 20th Century discovery was that the unique Hepburn variety of the Grey Crowned finch was breeding only on Mt. Shasta and nowhere else in the world. But in general during the 20th Century no great discoveries have been reported about the zoology of Mt. Shasta. Mt. Shasta continues to be a habitat for a great wealth of creatures, who perhaps themselves are content in not being disturbed by curious zoologists.

The [MS number] indicates the Mount Shasta Special Collection accession numbers used by the College of the Siskiyous Library.

[MS2019]. Bury, Robert J. **The Effect of Certain Environmental Factors on the Behavior of Nocturnal Nival Coleoptera in Oregon and California**. 1980 Thesis (M.A.)--San Jose State University. Bibliography: leaves 95-97. "The study showed that the nival Coleoptera observed were mainly on the snow surfaces during nocturnal periods, while temperatures were close to freezing.' Representatives of the carabid species, Bembidion improvidens Casey, were studied on Mount Shasta, Calif. and Mount Hood, Oregon during the summer of 1978." 32. Science: Zoology. [MS2019].

[MS595]. Camp, Charles Lewis 1893-1975. **Earth Song: A Prologue to History**. Berkeley, Calif.: University of California Press, 1952. pp. 2-4, 62-64. Contains an account of the discovery, near the town of McArthur, California, of the fossil remains of the giant bison which once roamed in the Mt. Shasta region. The bison horn core found there measured 22 inches round the base. Plate 10 on p. 63, which is an artist's rendition of the bison, shows Mt. Shasta in the background. The drawing caption reads: "Giant bison (Bison latifrons) at Mt. Shasta. Represents a species distributed across North America in the Middle Pleistocene" (p. 63).

Charles L. Camp was a noted U.C. Berkeley paleontologist. He was also the author of books on Western American history, being best-known as the collaborator with H. R. Wagner on the early edition of the definitive bibliography The

Plains and the Rockies: A Critical Bibliography of Exploration, Adventure and Travel in the American West 1800-1865. 32. Science: Zoology. [MS595].

[MS228]. Feilner, John 1864. **Exploration in Upper California in 1860 under the Auspices of the Smithsonian Institution**. In: Smith, Donald K. **Sergeant Feilner's Furlough: Perils and Profits of a Scientific Journey into Modoc Tribal Lands in 1860**. Chico, Calif.: Association for Northern California Records and Research, [1976]. First published in the Annual Report of the Board of Regents of the Smithsonian Institution, 1864, pp. 421-430. The Smithsonian Institution requested the author to make collections of birds, eggs, nests, etc. in the Mount Shasta and Klamath Lake region. Stationed at Fort Crook near present-day Fall River Mills on the Pit River, John Feilner made his way along the "Yreka Road" to Pilgrim's Camp on the south-east side of Mount Shasta. His adventures near Mt. Shasta begin simply enough: "May 15. Left Pilgrim's camp early, deeming it more advisable to travel for warmth than to remain shivering in camp. The winter in this section of the country being very severe, the springs are necessarily backward, and one will often find snow on this road in June; in fact, 'Shasta Butte,' in our immediate vicinity, is covered with snow the whole year, presenting a very picturesque appearance" (p. 37).

Shortly after arriving in Yreka, Feilner ran into considerable Indian trouble, and his accounts are highly entertaining: "...we had but time to make good our retreat to a deserted cabin some six miles distant, which we barricaded as best we could, and made 'loop holes,' through which to discharge our pieces. Thus fortified, we could have withstood the assault of quite a large force; but one of our party, a young married man, had a wife in a cabin some two miles distant, and as he was apprehensive of her safety, he determined to go to her, which he succeeded in doing, escaping the vigilance of the Indians. Our cabin was attacked several times, but we beat off our assailants and took advantage of the cover of night to make good our retreat to the cabin of the married man (pp. 39-40)." Much of Feilner's report consists of details of the bird life in the region. For example, about the 'great shrike' he writes: "Very few are to be seen about Fort Crook, California, but in Shasta valley, about the cedar brush, near Sheep Rock, I found it quite abundant, and pugnacious as usual" (p. 41).

The report also contains a copy of Feilner's "Map from Fort Crook Cal. to Yreka, Buttecreek Valley, and vicinity. Drawn by John Feilner, 1st Sergeant Company F 1st Dragoons, U.S. Army." This map shows 'Shasta Butte' as the most prominent feature, and shows the site of Pilgrim's camp.

The scholarly introduction by Donald K. Smith contains a documented survey of the history of the road from Fort Crook to Yreka, and as well contains an analysis of Feilner's journey.

Note that George Gibbs in 1862 interviewed, in Washington D.C., a Pit River Indian who accompanied Feilner back to that city (see Gibbs Comparative Vocabulary of Lutami (Clamet), manuscript, 1862). 32. Science: Zoology. [MS228].

[MS956]. Grinnell, Joseph 1877-1939 and Miller, Alden H. 1906. **The Distribution of the Birds of California**. Berkeley, Calif.: Cooper Ornithological Club, Dec. 30, 1944. pp. 457-458. [Hepburn Gray-crowned Rosy Finch: Leucosticte tephrocotis littoralis] A rare alpine bird, a variety of the more common Gray-crowned Rosy Finch, is thought to breed only on Mt. Shasta. The authors summarize their findings as follows: "Status--Occurs both as a summer resident and winter visitant; little known within State, but fairly common in restricted breeding area. Geographic Range--As breeding, Mount Shasta, Siskiyou County. In early spring detected in winter-visitant status in southern Lassen County. Life-zone in summer, Alpine; invades upper Hudsonian locally to forage. Recorded occurrences: head of Mud Creek, 10,000 feet, Mount Shasta (Merriam, N. Amer. Fauna No. 16, 1899:124; A. H. Miller, Condor, 41, 1939:219, and ibid., 43, 1941:72); 2 miles south and 3 miles east of Chats, 5500 feet, Lassen County, March 30, 1941 (Miller and Twining, Condor, 45, 1943:78). Habitat--In summer, cliffs, talus slopes, moraines, and snow and ice surfaces in high mountain canyons and glacial cirques."

A map showing the distribution of Gray-crowned Rosy Finches appears on page 457. 32. Science: Zoology. [MS956].

[MS881]. Hall, Harvey Monroe 1874-1932 and Grinnell, Joseph 1877-1939. **Life-Zone Indicators in California**. In: Proceedings of the California Academy of Sciences, Fourth Series. June 16, 1919. Vol. 9. No. 2. pp. 37-67. The authors were distinguished California scientists from the University of California at Berkeley. They state that "Since the delimitation of life-zones as outlined by Merriam is accepted in the main by the present authors, these zonal limits are determined as far as possible by means of indicators listed by Merriam himself, especially in his later publications (Merriam 1899, etc.). Since the nomenclature first proposed by Merriam has now become well established we consider it highly undesirable that any other should be promulgated" (p.42).

The bibliography in this paper lists "Merriam 1899" as C. Hart Merriam's 1899 Results of a Biological Survey of Mount Shasta, California. Thus the authors indirectly confirm that Merriam's Mount Shasta biological survey conducted

in 1898 was of major importance in furthering and refining one of the most important theories ever devised for the understanding of the world-wide geographical distribution of plants and animals. 32. Science: Zoology. [MS881].

[MS43]. Keeler, Charles Augustus 1871-1937. **Bird Notes Afield: Essays on the Birds of the Pacific Coast with a Field Check List**. San Francisco, Calif.: Paul Elder and Company, 1907. First published 1899, revised and enlarged 1907. The revised 1907 edition contains a new chapter entitled "In Sight of Shasta" (pp. 119-126). The author spent a summer on the upper Sacramento River and wrote about the birds and forest life in sight of both Castle Crags and Mt. Shasta. Unusual are Keeler's frequent references to the actual sounds of the bird life in the Shasta region forests, like the "twee-twee-twee-twee-twee'-cha" of the black-throated gray warbler and the "ca-wie'you, ca-wie'-you" of the black-headed grosbeak. Keeler ends the Shasta chapter with a final sentence "The wilderness is theirs by natural right, and it is fitting that we yield to them something of the respect which is their due" (p. 126). Keeler was the director of the California Academy of Science Museum and a noted California poet. 32. Science: Zoology. [MS43].

[MS1202]. Kellogg, Louise 1880. **Report Upon Mammals and Birds Found in Portions of Trinity, Siskiyou and Shasta Counties, California, with Descriptions of a New Dipodomys**. Berkeley, Calif.: University of California Press, 1916. One of the few scientific explorations in the Mount Shasta region undertaken by women exclusively. Louise Kellogg and Miss Annie M. Alexander spent several months of 1911 exploring in the northern California region. They ascended the Trinity River towards Mt. Eddy and climbed that peak. They also spent days at Toad Lake near Mt. Shasta and then descended to the town of Sisson, from whence they journeyed to Castle Lake.

This report contains an interesting series of informal as well as scientific observations about the local terrain as it was found in 1911. For Mount Eddy the author writes: "We made the ascent August 14 by way of Deadfall Ca–on and experienced no hard climbing at all, but found it undesirable to stay long on the summit on account of the violent wind that was blowing. The southwest side of the peak is well timbered with foxtail pine, and a few straggling white-bark pines reach almost to the barren summit, which is covered with loose shale rock....Mount Shasta looked stupendous, but the view toward the Sacramento Valley was unsatisfactory on account of the haze" (p. 348). Contains the author's photographs of selected views and of selected animal habitats. 32. Science: Zoology. [MS1202].

[MS957]. Marcot, Bruce G. **California Wildlife [and] Habitat Relationships Program: North Coast [and] Cascade Zone**. Six Rivers National Forest, 1979. [Hepburn Gray-crowned Rosy Finch: Leucosticte tephrocotis littoralis] No pagination; entry No. 221 plus map. Within the California wildlife zone of the north coast and cascades [excluding Mt. Lassen, see map], the Gray-crowned Rosy Finch is exclusively represented by the Hepburn race. This rare Heburn race of the bird breeds only on Mt. Shasta, thus the authors define the bird as follows: "Status - No official listed status. Uncommon and local resident in alpine tundra area at Mt. Shasta. Moves to adjacent lowlands in winter. Mt. Shasta holds the Hepburn race (L.t. littoralis). Curiously absent from apparently suitable habitat on Mt. Lassen and in the Warner Mtns. General Habitat - Alpine meadows, for breeding and feeding. Sagebrush steppe, also for feeding. Special Habitat Requirements - Open Cliffs, talus, and cirques above or near timberline." Additional breeding and food habits are given for the whole species, not just for the rarer Hepburn race.

A map of the California North Coast and Cascade management zone accompanies entry 221. Mt. Shasta is highlighted as the sole locale for this bird species. 32. Science: Zoology. [MS957].

[MS693]. McAllister, Matthew Hall. **Shasta's Glacial Discovery**. In: Mount Shasta Herald. Mt. Shasta, Calif.: Sept. 2, 1926. Describes the discovery of the skull and bones of an animal taken from the ice at the 14,000 foot level of Mt. Shasta. Curators at the California Academy of Science positively identified the animal as an antelope. How this animal got to that height is unknown. 32. Science: Zoology. [MS693].

[MS169]. Merriam, Clinton Hart 1855-1942. **Results of a Biological Survey of Mount Shasta, California**. Washington, D. C.: U.S. Department of Agriculture, Division of Biological Survey, 1899. This is the classic 19th century report on Mount Shasta's natural history. The survey was conducted by the U. S. Biological Survey which later became known as the U.S. Fish and Wildlife Service. Field work for the study was conducted during the summer of 1898, and five of the plants collected by the expedition were later used as type specimens of new species and were given names commemorating the discoverers and/or the high altitude location of collection (see Greene "New and Noteworthy Species" in Pittonia 1899-1901).

The survey group, led by Merriam, made its initial camp at Wagon Camp on the south slope of the mountain. The first job was to make a preliminary reconnaissance of the entire mountain. On the fourth morning of the circumambulation they climbed to 10,000 feet and encountered the great canyon on the west flank of Shastina. This canyon, Merriam wrote, "I named Diller Canyon, in honor of J. S. Diller of the U.S. Geological Survey, in recognition of his admirable researches

on the geology of Shasta" (p. 12).

After the preliminary reconnaissance the group made a base camp in a grove of black alpine hemlocks near the head of the west branch of Squaw Creek, close to and just east of the upper end of Red Butte. From here temporary camps were established at Panther Creek, Mud Creek, Clear Creek, Ash Creek, Sisson, Squaw Creek Valley, McCloud Valley, Shasta Valley, and Little Shasta Valley. Merriam describes the forest fires he encountered on the mountain in 1898 (p. 46).

C. Hart Merriam is well-known for his formulation of the Life Zone concept. In this study he presents one of the earliest applications of his concept that a gain in height on a mountain is similar to traveling north in latitude. Merriam divided Mount Shasta theoretically into five zones of study: The Upper Sonoran zone; Transition zone; Canadian zone; Hudsonian zone; Alpine zone. Note that William Bridge Cooke would later dispute the existence of a true Alpine zone on Mt. Shasta (see Cooke. "The Problem of Life Zones on Mount Shasta" In Madrono Vol. 6, 1941). Merriam correlated each zone on Mount Shasta with the zone's corresponding species of birds, mammals and plants. The detailed lists are very complete. Information on the biology of the individual species is discussed in separate chapters on the mammals, birds, and plants.

Illustrations by famous wildlife artists E. T. Seton, L. A. Fuertes, and J. L. Ridgeway are used extensively for the bird and mammal chapters. Three different forests types on Mount Shasta are discussed and illustrated by photographs: Yellow Pine belt; Shasta Fir belt; and White-bark Pine belt. The book also contains five full page photographic plates of Mount Shasta, three of them from photographs by J.S. Diller. 32. Science: Zoology. [MS169].

[MS1030]. Miller, Alden H. 1906. **Birds of the Alpine Zone of Mt. Shasta, California**. In: The Condor. Oct., 1939. Vol. 41. pp. 218-219. 'Alden H. Miller, Museum of Vertebrate Zoology, Berkeley, California, September 5, 1939.' Journal published by the Cooper Ornithological Club. Contains a highly favorable review of C. Hart Merriam's 1899 Biological Survey Report, then notes some unresolved determinations, especially as concerns the status of the only two alpine zone bird species mentioned by Merriam, the [Water-]Pipit (Anthus spinoletta) and the Rosy Finch (Leucosticte tephrocotis).

Of the Pipits the author states: "From July 13 to 18th, 1939, I camped on Panther Creek and on the 14th, 15th, and 17th carefully searched the basins and slopes from timberline (8000 feet) to about 10,000 feet at the headwaters of the creek. No pipits could be found....East of Panther Creek at the head of Squaw Creek...no pipits could be found...We need not doubt that Merriam heard pipits in the summer on the mountain. They may well have been strays that were not breeding."

Of the Rosy Finch: "In hunting for Rosy Finches...at the head of Mud Creek, I found Rosy Finches on July 15, 1939. Three were noted, and two collected, at 10,000 feet. One of the birds, a female, was carrying a large supply of insects in her mouth, and she had a brood patch. Evidently leucosites were nesting sparingly and scatteringly in the crumbling cliffs about the glaciers. The gulch was exceedingly barren of life.

Contains an extensive analysis for distribution of the Rosy Finch. 32. Science: Zoology. [MS1030].

[MS1028]. [Mount Shasta Herald]. **Caterpillar Army Feeding at 6500 Feet on Northeast Slope**. In: Mount Shasta Herald. Mt. Shasta, Calif.: Dec. 12, 1928. p. 1. Edward Stuhl, while camped near Inconstance Creek, discovered a caterpillar invasion. The article states that 'A great army of caterpillars are now feeding on the northeastern slope of Mt. Shasta, stripping the manzanita, snow, and buck brush as they go.' 32. Science: Zoology. [MS1028].

[MS650]. Newberry, John Strong 1822-1892. **Zoology of the Route**. In: **Reports of Explorations and Surveys to Ascertain the Most Practicable and Economical Route for a Railroad from the Mississippi River to the Pacific Ocean. Made under the Direction of the Secretary of War, in 1854-1855, According to Acts of Congress of March 3, 1853, May 31, 1854, and August 5, 1854. Volume VI. 33rd Congress. 2d Session. House Document 91**. Washington, D. C.: A.O.P. Nicholson, Printer, 1857. Part 4. pp. 1-114, following Parts 1, 2, and 3. Contains notice that the report was not complete at the time of publication. Illustrated with full-page plates in both black and white and color. J. S. Newberry, namesake of the Newberry Crater volcano in southern Oregon, wrote the geological, botanical, and zoological reports for the 1854-1855 Abbot (see Abbot 1857) and Williamson Railroad Survey. It is assumed that Newberry was a member of the expedition. 32. Science: Zoology. [MS650].

[MS1228]. Peatte, Donald Culross. **The Nature of Things**. In: Bird Lore. Sept.-Oct. 1940. Vol. 42. pp. 427-430. Peatte was a well-known nature essayist. He says in part: "People sometimes ask why Mount Shasta, that lonely snowcapped sentinel of north-central California, is not a national park. Beautiful as Fujiyama, it is the most famous California mountain, to people who have never seen it. Old pictures show a mighty coniferous forest of western yellow pine, sugar pine, Douglas fir and white fir and incense cedar, marching up the flanks to the very snows. Actually the lower slopes of Shasta and the rising tableland around it are Exhibit A of what is left when lumbering, after the old methods,

gets through with an area. From every approach you see stumps and sticks- stumps cut off at ten and fifteen feet in many cases, because the swell butt is useless at the mills... "(p. 428). 32. Science: Zoology. [MS1228].

[MS601]. Purdy, Fred L. **Mountain Goat Will Return to Siskiyou**. In: San Francisco News. San Francisco, Calif.: May, 6, 1933. Second Section. p. 12. Source: Stuhl bibliography. Plan to replant Mountain Sheep on Mt. Shasta. 40. Find List/32. Science: Zoology. [MS601].

[MS2020]. Simons, Lee Hervey. **Distributional Ecology of Terrestrial Micromammals Based on Resource Preferences : field studies in northern California**. 1997 Thesis (Ph. D.)--University of California, Davis, 1997. Includes bibliographical references: leaves 7-8, 18-19, 69-76c, 134-137, 152.
Contents: General abstract -- Introduction to the chapters -- Micromammal diversity at the Shasta Mudflow Research Natural Area -- Insular specialization and occurrence of riparian-associated micromammals in a fragmented landscape -- Impact specialization: a strategy for assessing environmental impacts and restoration -- Conclusion to the chapters. 32. Science: Zoology. [MS2020].

[MS620]. Townsend, Charles Haskins 1859-1944. **Field Notes on the Mammals, Birds, and Reptiles of Northern California**. In: **Proceedings of the U.S. National Museum**. Washington, D. C.: Smithsonian Institution, Nov., 1887. pp. 159-241. Contains extensive zoological notes of Mt. Shasta by noted naturalist Charles H. Townsend. The author spent more than one year in northern California, from April 1, 1883 until July 15, 1884 (p. 159). The extensive notes from Mt. Shasta, illustrations of the vertical profile of Mt. Shasta, and the listing of vertical distribution of birds in Northern California lead to the conclusion that Townsend made the first professional biological survey of Mt. Shasta, predating C. Hart Merriam by about 15 years (see Merriam 1899).

Townsend states: "During the summer of 1883 I traveled through the Mount Shasta country in Siskiyou County, with a party of the United States Geological Survey, the topographical division, Prof. Gilbert Thompson in charge. The route included Yreka and the headwaters of the McCloud River as well. Much time was spent on the higher slopes of the mountain, the summit of which is 14,440 feet high, and clothed in perpetual snow. North of Mt. Shasta there are extensive sage plains stretching away toward Oregon, but immediately around the mountain and to the southward are continuous and magnificent pine forests. The nature of the country in general is so frequently explained in the following notes that it is unnecessary to speak further of it here."

Townsend describes his observations of the geographical distribution and behavior of over one hundred individual species of birds and animals. Often his notes mention details of Mt. Shasta: "Haliaeetus leucocephalus (Linn.). Bald Eagle. Eagles were frequently seen in Northern California, and with exception of the one mentioned in the preceding paragraph, I think they were all of this species. They are destructive to young lambs, and the sheep-herders in many localities are their sworn enemies. When on the extreme peak of Shasta (14,440 feet altitude), on July 27, 1883, in company with members of the U. S. Geological Survey, an Eagle came up through the fog that had gathered immediately below us and shared with us our rocky pinnacle above the clouds" (p. 202).

Of the Bighorn, or Mountain Sheep, the author says: "There is probably not a single Bighorn remaining either on Shasta or its outlying spur, Sheep Rock. I had the privilege of traveling over every part of this particular section with the topographical Division of the U.S Geological Survey during the summer of 1883, and we could find no traces of its presence. Resident hunters reported it as having disappeared, none having been seen for more than six years. Its former abundance at Sheep Rock was attested by the great numbers of its horns and bones, which were scattered about everywhere. Prof. Gilbert Thompson, in charge of our party, pointed out to me a complete skeleton of this animal at the foot of the Mud Creek glacier, high up on Mount Shasta" (pp. 170-171).

Of the beaver he states: "Castor fiber (LinnŽ.) Beaver. Rather common along the wilder streams of the region, such as the Upper Sacramento and the McCloud Rivers. At the western base of Mount Shasta a number of them occupied unmolested a dam, which they had constructed in a corner of a meadow belonging to Mr. J. H. Sisson" (p. 175).

Townsend includes a wealth of interesting details to his notes. For example: "Plethodon i‘canus (Cope.) Mount Shasta Salamander. Described by Professor Cope from a specimen which he found near the mouth of the McCloud. (Proc. Acad. Nat. Sci. Philadelphia., 1883, p. 24.) My own specimen is from the same place. Professor Cope named this species 'from the aboriginal name, I‘ka, of the grand peak of Northern California, Mount Shasta. From the same name the town of Yreka derives its name.' I can think of no better English name than Mount Shasta Salamander" (pp. 240-241).

Charles H. Townsend later became acting director of the American Museum of Natural History, director of the New York Aquarium, and chief of the division of fisheries of the U.S. Fish Commission. His Mount Shasta notes indicate he was on the mountain in both July and September of 1883 (p. 165). He also credits Mt. Shasta pioneer J. H. Sisson for substantial help (p. 164). 32. Science: Zoology. [MS620].

[MS621]. Van Dyke, Edwin Cooper 1869-1952. **Great Basin Tent Caterpillar**. In: Pan Pacific Entomologist. Oct., 1928. Vol. 5. p. 92. The article in its entirety states: "Great Basin Tent Caterpillar. During the summer of 1928 there was an extensive outbreak of the Great Basin tent caterpillar, Malacosoma fragilis (Stretch), in the chaparral regions from Truckee north to the Klamath Indian Reservation in Oregon, and most marked about Mount Shasta and in Klamath County, Oregon. A similar outbreak was reported in 1921, and another reported by me in 1914 (Month. Bull. Calif. State Comm. of Hort., Vol. III, No. 9, September 1914, pp. 351-355), thus showing a periodicity with a seven-year interval. Great outbreaks of the California tortoise-shell butterfly, Agalais californica (Bdv.), also occur in the northern Sierras. One of these was recorded in 1913, and another of considerable extent in 1926, Mr. Charles L. Steward[t]informing me that great numbers of these were to be found as high up as 14,000 feet on Mount Shasta. By defoliating and killing much of the Ceanothus or deer brush and other shrubs, these two insects greatly increase the fire menace within their territory." 32. Science: Zoology. [MS621].