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Willows of the High Sierra

GEORGE ZENTMYER Field School 1935

Representing a nearly complete collection of the willows of the High Sierra, ten different species of willow were found during the course of the two weeks' trip into the high country by the Yosemite School of Field Natural History last summer.

Many and varied are the localities in which members of this interesting genus (Salix) may be found. Typically they are associated with moisture, often growing along stream banks. In the High Sierra, however, willows may be found high up in little alpine meadows, in steep, rocky canyons with no trace of surface water, or on the sides of rocky slopes.

Equally varied are the forms of the willows found in the High Sierra. All degrees of variation in size are found between the beautiful little alpine willow (Salix petrophila caespitosa), which is usually not over two or three inches high, and a variety of the Red Willow (Salix lasiandra abramsi), which often grows to be a good sized tree thirty to forty feet in height.

Although the species of willows are rather difficult to identify as a rule due to the variation within the species itself, there are a number of characters which may be said to be reliable and constant in classification. The principle characteristics of the High Sierra willows follow:

1. RED WILLOW (Salix lasiandra abramsi Ball; S. lasiandra lancifolia of Jepson).

This species of willow is distinguished from all other willows in the High Sierra by its long, lanceolate leaves, in which the leaf length is four to five times the width or more. It also occurs only at lower elevations—up to 8,500 feet. This willow was collected last summer on the shores of Washburn Lake.

2. ALPINE WILLOW (Salix petrophila caespitosa (Kennedy)

S. hn.; S. petrophila Rydb).

This species is readily recognized because of its dwarf habit, being a creeping alpine shrub with vertical branches seldom over three inches in height. The beautiful silky catkins are very striking in this species in mid-summer; they often exceed the plant itself in height. Habitat—alpine summits, 9,000 to 11,000 feet.

3. MONO WILLOW (Salix monica Bebb; S. phylicifolia var. monica Jeps).

The Mono Willow occurs quite commonly in the Tuolumne Meadows region and throughout the high country to some extent at elevations of 8,000 to 13,000 feet. It is recognized by the bright green, glabrous, nearly ovate leaves; and the deep reddish or reddish-purple color of the young twigs. The leaves are usually small, not over 1 to 1½ inches in length by one-quarter to three-quarters inches in width.

4. LEMMON'S WILLOW (Salix lemmoni Bebb).

This species is similar to the Mono Willow in having glabrate, bright-green leaves, but differs in that the leaves are more elongated (lanceolate instead of ovate) and longer. One and one-half to three inches long by three-eights to five-eights inches wide. The catkins of this species are usually larger than those of the Mono Willow also.

5. EASTWOOD'S WILLOW (Salix eastwoodiae Cokrl; S. commutata Bebb).

This species, as does the following one, has leaves which are typically densely hairy or tomentose on both sides. It is distinguished from the Sierra Willow by the presence of small glandular teeth on the leaf margins, and by the tomentose branch tips. Eastwood's Willow occurs quite commonly in the High Sierra at elevations of from 6,000 to 10,000 feet.

6. SIERRA WILLOW (Salix orestera Schn.; S. glauca var. orestera Jeps).

The Sierra Willow has leaves which are hairy or silky on both sides, but which are not glandular toothed. It is common at higher elevations in Yosemite National Park, and throughout the Sierra Nevada. It is usually a small shrub, from three to nine feet in height.

7. JEPSON'S WILLOW (Salix jepsoni Schn.; S sitchensis var. augustifolia Bebb).

This species is distinguished by having leaves which are nearly glabrous and dark green above, but densely silky tomentose and light-colored beneath. The leaves are nearly lanceolate, as contrasted to the wider, obovate leaves of the similar Sitka Willow. The catkins of the Jepson Willow are very distinctive, being long and narrow. This species grows at high elevations, from 7,000 to 10,000 feet.

8. SCOULER or NUTTALL WILLOW (Salix scouleriana Barratt).

The Nuttall Willow is characterized by the inversely egg-shaped (obovate) leaves; the leaves being

larger toward the tip. Another distinguishing character is that the leaves are glabrous. This willow is quite common in the mountains of California, and is often larger than the other High Sierra willows described in this article—reaching a height of 30 feet, but usually smaller.

9. GEYER WILLOW (Salix geyeriana Anderss).

This willow has small, narrow leaves which are thinly silky-pilose on both surfaces and have revolute margins. The principle distinguishing character of this species, however, is the bluish bloom appearing on the young black twigs. It is a small shrub, growing in Tuolumne Meadows and at middle elevations in the Sierra Nevada as a whole.

Four other species of willow are described by Ball as occuring at high elevations in California, although two of these are of doubtful occurrence in this State. None of these four were collected on last summer's trip. The species are S. commutata, S. sitchensis Sanson, S. bebbiana, Sarg. and S. nivalis Hook —the Snow Willow, a small, creeping, rare alpine species which has been collected on the Dana Plateau.

* Note: The nomenclature used in this article is that of Dr. Carleton R. Ball in his treatment of the genus Salix published in Abrams, Illustrated Flora of the Pacific States, Stanford University Press, 1923.

Passing Reflections

HAROLD E. PERRY Ranger-Naturalist

Increasing travel figures for the many National Parks are a source of satisfaction to the personnel of the National Park Service. Interpreted in terms of appreciation and recreation, these statistics mean that more and more people each year are finding the wholesome enjoyment and educational opportunities which are offorded by these nationally interesting outdoor areas.

The growing popularity of any National Park generally results in increased funds being set aside for the development of that area. The resultant improvements in roads, camping facilities, and hotel accommodations attract an ever increasing number of people and thus the circle of influence is continually widened.

There are many true lovers of the out-of-doors, however, who bemoan the intrusion of evidences of civilization into the national wilderness areas. They are the ones who are most at peace with themselves and with the world in general when they are enjoying the solitude of mountain fastnesses, far from the sounds and smells of luxury and ease. The coming of paved, high-

gear, automobile roads and the multitudes who speed over them are sources of distress to the rugged natures of these outdoor lovers. Thus it is that certain types of people are disturbed by the inevitable development within the National Parks.

However this feeling of concern need not extend to all of them. Yosemite National Park, for example, is fortunate in being able to offer much of worth and of interest to both types of people, those who at all times desire the conveniences of modern life and those who prefer to take their vacations with nature "in the rough." For the former, a wide range of living facilities are available, from the simplest camp along the river to the luxury afforded in a million dollar hotel. Splendid roads penetrate many spectacular parts of the Park and highly organized social activities are to be found in the more congested areas.

Yosemite also has much to offer the person who prefers more solitude in his attempts to commune with nature. The vast area surrounding the Valley, especially to the east, is a wonderland of scenic splendor. This may be penetrated either on foot or with pack animals and one may travel and fish and camp for days upon end with few if any human contacts. Five hikers' camps, organized and installed in 1923 by the Yosemite Park and Curry Company and located in the Merced and Tuolumne basins, are available as bases of operation to those who desire the adventure and accessibility of the High Sierra without the responsibilities of providing their own food and lodging. Certainly nature at its best is found in the Yosemite High Sierra.

Many visitors to Yosemite find countless opportunities in the Valley itself for being alone with nature. Despite the increasing numbers of people coming into the Valley year after year, it is still possible with very little effort to leave the crowds behind and to find desirable solitude. All that one has to do is move off the highway a short distance and he is alone with the out-of-doors. The crowds will continue to pass by on busy roads, but the individual who steps aside can find the isolation for which he hungers. Countless, restful retreats along the Merced River await the person who seeks them. Quiet zones of seclusion may be found in any of the several meadows which dot the Valley floor and the silence of the deep forest comes to those who wander among the trees which margin the meadows.

As one rests quietly in any of these areas of solitude, he soon loses the impression of being in a crowded valley. Nature awakens at his feet and overhead and he tends to become at one with the forces which direct the constant and fascinating activities of the out-of-doors.

So Yosemite National Park has much to offer its visitors regardless of their tastes and desires, and all those who come with a sincere purpose are able to find that which they seek most. Perhaps this is one of the chief reasons for Yosemite's ever increasing popularity.

RUBBER SNAKE DISGORGES LIZARD

By Ranger Naturalist
PAUL W. NESBIT

On June second a rubber snake (Charina bottae Blainville), which had been caught near the upper end of the Wawona Loop Road, was sent into the Yosemite Museum by Dr. James Asa White. The live specimen was twenty inches long and five-eighths of an inch in diameter. It had been placed in an empty gallon size fruit tin, and a paper with holes in it had been tied over the top.

Upon opening the package, it was discovered that the snake had disgorged a Bluebellied Lizard (Sceloporus occidentalis Baird and Girard). The lizard was an unusually large specimen, measuring five and a quarter inches in length including a stub tail only an inch and a quarter long. The body of the lizard was in quite good condition, indicating that it had only recently been swallowed. The only place where digestive activity could be noticed was on the back of the neck where some skin and muscle tissues were missing. This would indicate that not only was the lizard swallowed head first, as is usually the case, but that the digestive juices attack that region first. The lizard seemed very limber throughout and had probably had its bones crushed by constriction. It was covered by a thin transparent mucus, or digestive juce.

Inquiry brought out the facts that the snake appeared rather large in girth and somewhat active for a rubber snake before he was put

into the can. However, nothing was known as to what he might have eaten or when. He was handled considerably, which may help to account for the lizard having been disgorged. The skin of the snake

was quite loose when he was removed from the can, but this is characteristic of rubber snakes.

The maximum length of rubber snakes is about twenty-five inches. They are sometimes called two-headed snakes because of the blunt tail, which is nearly as blunt as the head. They are usually found in moist situations in coniferous forests. They are perfectly harmless and quite slow of movement, so it seems rather strange that they could catch an animal so active as a lizard. However, Van Denburgh in "Reptiles of Western North America," Vol. 11, p. 642, mentions two instances of this having happened. He also mentions a rubber snake which, when handled, regurgitated four out of six young mice which it had swallowed, and then swallowed one of the four again. The usual opinion is that rubber snakes live on more inactive forms of life such as slugs, worms and larval insects.

Butterfly Migration

EDMUND D. GODWIN Ranger-Naturalist

While it is among birds that migration is seen in its most typical form, it also occurs in other types of animals. There has been an unfortunate tendency, however, to apply the term migration in a loose way to many movements of animals which are not, in a strict sense, true migratory activities. Migration, defined in reference to its most typical expression in true migrators, as birds, salmon, seal, etc., takes the form of a periodic or seasonal mass movement between a breeding place and some other environment in which breeding does not occur. It is an hereditary thing, being activated by those intangible stimuli, internal or external, that we call instinct.

Animals that migrate do so for one main reason that may be interpreted in the light of its various manifestations or effects as being several; the reason is climatic differences produced by weather changes which correspond to seasonal variations. Some non-migratory animals in a region of severe climatic fluctuations avoid moving about by adapting themselves to a true hibernation state, in which the winter can be passed. Other animals, whose life span is equal to the seasonal cycle of climatic change, as many of the insects, spend the severe climatic span in a state of dormancy, the pupa.

Although several kinds of butterflies are popularly thought of as being migratory, we have, in reality, only one species of butterfly that engages in the true migratory maneuvers described above. The Monarch (Danaus menippe, Hbn.) is the only known North American migratory species. It is a member of a genus that is adapted to a tropical environment; it does not have the power of maintaining itself in any

of its stages throughout the winter in temperate or boreal climates. In consequence of these facts, it must, of necessity, inasmuch as it cannot adapt, nor can find a climate to suit its requirements the year around, change its position in accordance with the seasons.

In the fall of the year, one may see great aggregations of these butterflies at various places in the United States and Canada, as they swarm to travel in a southward direction in large enough numbers to darken the sky. Their routes of travel seem to be definitely established, apparently related in some way to water courses or coast lines, so that the same paths are followed year after year. It has been noted that certain trees or tree groves furnish annually a resting place for the butterflies which sometimes literally cover the trees. These trees have been known as "butterfly trees."

It is difficult to account for the gregarious migrating instinct of the Danaidæ, particularly in view of the fact that only certain broods in a given year take part in the migration. This butterfly is polygoneutic, or, in other words, produces several generations in one year. Only the fall brood enters into this general southward movement and a totally different generation, that of the early spring brood, moves in a northerly direction. The southward movement is the only one that occurs in association with the swarming instinct, while the northward spring movement is of a quite different character. The butterflies may be noted traveling singly and in a leisurely manner, and they probably advance in accord with the progress of the spring season.

More than statements of fact from observational data would be hypothetical gesticulation; we cannot explain these phenomena scientifically.

A very different type of mass movement occurs in other species of North American butterflies, and has given rise to the misunderstanding that other species engage in true migration. Outstanding examples are the Painted Lady (Vanessa cardui), the West Coast Lady (V. carye), the California Tortoise Shell (Aglais californica), and the Snout butterfly (Libythea bachmanni). The "migration" of these species is not in any sense the equivalent of the migration of the Monarch. These four butterflies have the power of over-wintering in the northern states, either as adults or chrysalids. It is not the response to an instinct that prompts a southward movement in the fall for the purpose of wintering over in a favorable environment, but rather is determined by the scarcity of food, and perhaps to some extent by the sudden subsidence of the several parasites which attack the chrysalids. It is not an annual occurrence, but is noted at infrequent intervals.

(Note) The discussion of Butterfly Migration in J. A. Comstock's BUTTERFLIES OF CALIFORNIA has been freely drawn upon.

YOSEMITE TRAVEL RECORD

1855 to 1863	653
1864	147
1865	369
1866	428
1867	502
1868	623
1869 (1)	1,122
1870	1,735
1871	2,137
1872	2,354
1873	2,550
1874	2,711
1875	2,423
1876	1,917
1877	1,392
1878	1,183
1879	1,385
1880	1,897
1881	2,173
1882	2,525
1883	2,831
1884	2,408
1885	2,590
1886 to 1901 (2)	
1902	8,023
1903	8,376
1904	9,500
1905	10,103
1906 (3)	5,414
1907 (4)	7,102
1908	8,850
1909	13,182
1910	13,610
1911	12,530
1912	10,834
1913	12,255
1914 (5)	15,154
1915 (6)	31,543
1916	33,333
1917	34,510
1918	35,527
1919	58,362
1920	68,906
1921	91,513
1922	100,506
1923	130,046
1924	146,070
1925	209,163
1926	274,209
1927 (7)	490,430
1928	460,619
1929	461,257
1930	458,563
1931	461,855
1932	498,239
1933 (8)	296,088
1934	309,431
1935	372,317
1936	431,192

Note:

(1) Overland Railroad completed.

(2) No travel record kept.

(3) San Francisco earthquake and fire. Yosemite Valley receded to Federal Government.

(4) Yosemite Valley Railroad opened to travel.

(5) End of Army administration. Autos admitted to Park.

(6) Increase in travel due to automobiles.

(7) Increase in travel due to completion of All Year Highway.

(8) Wawona acquired. All interpark and Mariposa Grove of Big Trees travel dropped from travel record totals from 1933 on. 1936 travel if computed on old basis would be 604,683.