

YOSEMITE NATURE NOTES



DEPARTMENT *of the* INTERIOR
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Acting Superintendent

YOSEMITE NATURE NOTES

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MONROE'S BOUQUET

By William C Godfrey

A new wagon road, following the course of the first trail from Clark's Station to the Yosemite valley, was under construction in the early 70's. Since completion of this road in July, 1875, the several generations of visitors to Yosemite valley have witnessed many changes. Clark's Station afterwards became known as Wawona, and a radical change in the mode of transportation has made it possible for the present day visitor to travel over the same route with a decided degree of comfort and safety. Until completion of the all-year highway in 1926, this famous old Wawona road afforded the easiest access into Yosemite valley.

Today motorists visiting Glacier Point, Wawona, and the Mariposa Grove of Big Trees over this road, upon which automobiles have been traveling since 1914, seldom fail to comment on the scenery and refer to those early days when the cadence of the clattering hoofs of four or six prancing horses harmonized with the rattle of the old-fashioned stage coach. Ahead of clouds of dust they climbed out of

the foothills, through the chaparral forest, and eventually into the cool, peaceful forests of stately pines. The changing scenery held the interest of the passengers, even though they bounced around on the seats of the old wooden stage coach along the Wawona road.

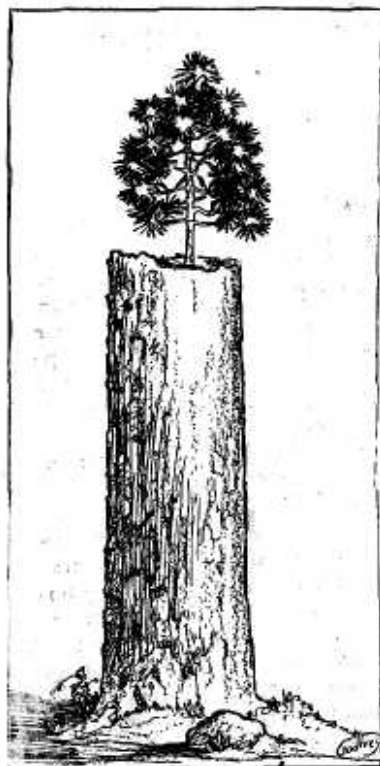
A Halt for a Lecture

As they entered that section of the forest where one first notices large sugar pine cones lying on the mat of bear clover that forms the forest cover beneath great pine trees, the driver of the old horse-drawn stage would draw in on his lines until the horses were brought to a complete stop. Leaning back in his seat and slowly turning to his passengers, he would reach out and touch a tall white fir stump with the stock of his whip, which he held in his right hand.

"Now this here is Monroe's Bouquet," he would be heard to say. And, as the interested passengers looked at the little sugar pine tree perched on top of the stump, the driver would relate the story of this odd little tree that had reached a height of about twenty inches since

it sprouted from a wind-carried seed where soil was barely sufficient to stimulate growth. Other sugar pine trees around it, of the same generation, and growing, conceivably, from seeds of the same cone from which the seed of "Mon-

roe's Bouquet" had fallen, had reached a height of 40 to 60 feet and formed a normal young sugar pine stand, while this curious little tree, stunted through lack of proper nourishment, continued its struggle for existence.



MONROE'S BOUQUET

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Helped It Along

Talking on, the driver would relate how George F. Monroe, one-

time ace of stage drivers of the Yosemite Stage and Turnpike Company, after whom Monroe Meadows and Fort Monroe stations along this same road were named, would, out of pure sentiment, stop his coach at this same stump on each journey to Yosemite valley and empty the contents of his water canteen on the roots of this midget of the forest. Although Monroe died during 1886, the little tree still keeps alive the name of this famous stage driver who, from 1868 until his death, held a reputation as the most competent and trusted driver of his day.

Today the modern motor stages traveling between Yosemite valley and Wawona frequently stop at this same white fir stump while the driver tells the story of the little hermit growing from its broken top.

The white fir stump measures 34 inches in diameter at breast height and is nearly 11 feet high. At the top of this column, from which the original tree broke and fell to the ground so long ago, this little sugar pine is growing. With a diameter of less than two inches at the base, the little tree has reached a height of but 26 inches. At first one might judge it to be eight, or perhaps ten years old, but witness its history. The fact that it has been used as a landmark by old-time stage drivers who were personally acquainted with the famous driver after whom this dwarf was named and who vouch for its existence in its peculiar setting as far back as they can remember and the whole combination of circumstances surrounding its existence bear evidence of its being one of the oldest little trees in the Yosemite region.

SIDELIGHTS ON MAJOR JAMES SAVAGE

By Ida Savage Bolles

Editor's Note: Maj. James Savage discovered Yosemite Valley on March 25, 1851. Since then travelers from all over the earth have accorded it a place equal to that of any of the other scenic wonders of the world.

The following reminiscences of the life of Major Savage are copied from the original letter from his cousin, Mrs. (Harriett) Ida Savage Bolles, Berkeley, Calif., under date of February 20, 1929.

Major James Savage

"One little Indian, two little Indians, eight little Indian cousins."—Thus did my father interpret the popular nursery rhyme for our good night lullaby. My father, John W. Savage was county judge of Cass county in Central Illinois—a politician, but, first, he was our father in duty and responsibility to eight of the livest youngsters that ever lived.

"My father was born in 1834, in Illinois, and, in 1853, at the age of 19, came to California, via New York and the Isthmus of Panama, to join a cousin in Mariposa. This cousin, Maj. James Savage, had written for him to come, saying that he would make him a rich man. But when my father reached Mariposa, he found his cousin had been shot and killed 'by an unscrupulous man over the Indians, whom Major Savage had been protecting and who, in turn, had made him the reputedly richest man in the state of California. His vast stores of gold had disappeared, the Indians were scattered, and the report was that the state of California had appropriated his wealth.

(It was probably appropriated by his murderer and his gang.) Being a mere youth and an unprincipled element in control of local affairs, my father could do nothing.

"He went from Mariposa to Sutter's mill and worked as all gold miners were working in those days. He could not get enough money ahead even to go home, so my grandfather, after a year's time, sent him money to return the same way he came, via Panama and New York.

"So far as our family accounts go, being handed down by mouth, this cousin, James Savage, as a youth had joined Fremont's men and 'gone to California.' When it was learned that he had cast his lot with the Indians, even to marrying Indian women, his immediate family renounced him. But not my father; there was too much lure of adventure to create his disapproval.

A Man of Mystery

"There were four children of whom I know in our cousin's family, two boys and two girls. The other boy, Morgan, died young. One sister, Harriett (also my name) became Mrs. John Piper of Princeton, Ill.; the other, Mrs. Amanda Scudder of Virginia, Ill. I remember both distinctly. They were beautiful cultured women. So, because of his sisters' disapproval of his life with the Indians, he never divulged in California where he came from, and was known as a man of mystery. The Indians thought him a sort of god, and he was known as 'king of the Tulares.' How much of an education he had I do not know, but I do know that as a child

I always heard the Savages spoken of as the 'best off' and most aristocratic family of Central Illinois. My own grandfather's best friend in youth was later Governor Seymour of New York.

"As to Major Savage's birth, I have heard the family say he was born in Morgan county, Illinois, near Jacksonville. The original Savage family lived in Utica, N. Y., two sons of seven pioneering to Illinois. They were James Savage, Major Savage's father, and John Savage, my grandfather. I have understood that the Savages of the Savage Rifle Company and later Savage Tire Company are the same family. I have never taken the trouble to prove it. However, all came from Utica.

"I remember one time when Cousins John and Harriett Piper were visiting us at Virginia, Ill., I sat up late one night listening, as small children do, to their elders' interesting talks, even though they don't grasp it all, and particularly if there are any Indians in the discussions. Father was advising Cousin

Harriett to come to California and claim her brother's wealth. She steadfastly refused, saying he had Indian offspring, and they would some day realize who they were and seek their inheritance. But father insisted that an Indian would get little justice, and, if she wanted them to have the wealth, to come out and fight for it. But no one ever came. So we all unwittingly, mostly because of distant homes, have remained silent, till the summer of 1927, when I went into the Yosemite and found the name of this same cousin, Maj. James Savage, honored as the discoverer of the Yosemite and early protector of the Indians. Nothing aside from his life in California was known of him here, so, as a matter of information and clarification as to his origin and as a history for my own children to keep, I have written these, my early memories of his family and my childish glorification of the cousin who had 'gone to California' and cast his lot among the loyal, picturesque, but much-abused Indians."

NOTES OF A MID-WINTER WANDERER IN YOSEMITE VALLEY

By George M. Wright

THE LAZY QUAIL

A few south-facing, well-drained spots about the rim of Yosemite Valley have the climate of a warmer zone thousands of feet lower down on the mountain slope, even though it be the middle of a snowy winter such as the present one. In these sunny oases, resident birds and winter visitants foregather during the bright dazzling white days to revel in the warmth that is at this season only to be found in

the direct rays of the sun. There, too, they can gather the last of the seed crop on ground patches newly bared of snow. In such a place one might look with promise of success for the mountain quail (*Oreortyx picta plumifera*), with its gaudy robe painted in the manner of some barbaric Indian art.

On the morning of February 9 I trudged breathlessly upward through a white and icy world

towards the top of the Tenaya Zig zags, where I knew such a favored area existed. A little more than half-way of the distance up a series of soft, sweet "ker-ker-ker" notes gave cry that mountain quail were there in peace and contentment. And there they were, two of them, disporting their way downward on the steep slope in elegant leisure that betokened no quarrel whatever with the gifts of life.

The perpetrator of the first tracks to blemish the snow along the trail since the last storm, quite upset their equanimity and they burst away on noisy wings to cover in the thick bushes close by. The point from which they both took off was along the downhill edge of the trail.

As a third member of the little band came into sight, I froze, or at least remained as approximately motionless as a man can when in a panting condition. Following the gentle rustlings and occasional calls of its companions, this bird stalked deliberately across the snow. Apparently it did not share any inherent quail distaste for such

a chilly carpet, as witnessed by lack of any inclination to hurry or circumvent this patch.

On the other hand, the little drop of four feet off the trail embankment presented a problem of some magnitude to the dainty creature. Four dubious, troubled minutes did this bird spend in contemplation of an obstacle which should have seemed small indeed to one endowed with such a convenient pair of wings. In futile search of a break in the diminutive rock wall, it fussed and worried for thirty feet or more along the trail to a place of not so terrifying altitude, and finally made a jump down of about 18 inches without the flutter of a wing feather.

As I started on upward, cogitating the ways of some birds I came upon a fourth mountain quail. This one promptly and easily whirred off to shelter in a golden-cupped oak. More than ever I wondered that any avian could become so agitated, exhibit such anxiety, and finally go such a roundabout way to its destination, rather than volplane or fly the very short distance of perhaps 18 feet.

VAREID THRUSHES A WINTER TREAT

Among Yosemite birds there are those familiar, constant friends, the year-round residents of the valley. And there is the swarm of musically inclined summer visitants whose arrival in the spring may be predicted almost to the day. But the northern varied thrush (*Ixoreus naevius meruloides*) belongs to a third group, one that in many respects the most fascinating of all. It is composed of those winter visitants whose arrival is always a source of great delight because of its uncertainty from year to year.

This winter varied thrushes are extremely abundant everywhere on the valley floor, be it superintendent's back yard or damp forest corridor. Silently they forage on the wet ground, and silently they fly up to wait in the trees above for the passing of some intruder. They are so common that local residents and visitors are constantly demanding the name of the "bird like a robin, with a black necklace and with an orange stripe on the side of its head and yellow wing patches." Alaska robin, northern

robin, and varied robin are some good local names for the varied thrush.

Not since the winter of 1924-25 has Yosemite been graced with such a lavish display of these beautiful birds. In some seasons the species may be represented by only an occasional individual, or perhaps none at all may be recorded. No wonder they arouse keen interest on such years as this, when, for some reason as yet not

definitely determined, they appear in numbers.

The long summer days find the varied thrushes deftly busy with family cares. This may be anywhere in the humid, deep woods from Oregon to Alaska. Who knows where they will go with the approach of each succeeding winter? Yosemite may be a favorite soon again. More likely, the varied thrushes will not return for several seasons.

BIRD ADVENTURES

By Enid Michael

Birds on their way south from the northern nesting grounds occasionally find themselves ahead of schedule. Then the young or in-

furnish bird lovers in the Yosemite with adventure during their strolls along the river bank. So it happened to me on the day after Christmas when, with two companions, I was walking along the river bank near the bear pits. Some distance ahead, in a stretch of placid water, we discovered a duck. Small and of dark color, the duck seemed to have no distinctive markings. My bird companion was mystified and said, "Surely, I know all the ducks in California, but I don't recognize this one. What can it be?"

The snow covering the ground crunched under every step, and close approach was difficult. In the end, we accomplished it by circling back into the forest and, coming again to the river bank, found the duck not 15 feet distant. We could now make out certain markings, such as whitish cheek patches and an exposed wire-like tail, and were able to identify the little wanderer as a ruddy duck—an immature female, we thought. It was a pleasure to meet our old friend, the ruddy duck, in the valley and to secure a new record for Yosemite.

Made uneasy by our presence,



HOODED MERGANSERS

quiring spirits among the water fowl may turn aside from the regular course for a little adventure, and a river such as the Merced furnishes a ready lane for this digression. These wanderers occasionally

the little visitor swam rapidly down-stream. Far down the river we watched it go; once in a twinkling rapid it was lost to sight, then discovered again on a placid pool—a tiny, floating speck on a broad, dark water between white banks of snow.

Later in the day when we followed the river through Leidig meadow, a pair of water fowl was discovered on an open pool. Approaching with caution, we sat upon the bank to observe them. The birds were hooded mergansers with beautiful, full plumes and, as they jerked their heads nervously, the gay, reddish headdresses quivered and scintillated in the sunshine. We wondered if these were young males not yet in mature plumage, for they were more handsome than the hooded mergansers we had seen

on former occasions. Agitated by our presence, they turned this way and that, not knowing what to do. Hurriedly they took counsel, came to a decision and, uttering a croak, or squawk, of protest, took to wing. They turned upstream and rapid wing-beats caused a soft whistling sound, like the wing-sound of the green-winged teal. A long stretch of frozen river forced them to fly far before arriving at another open pool.

The hooded merganser is a rare bird—an adventure for the bird-lover wherever met. My heart went out to these birds. How uncertain and tragic must be their existence, with the constant menace of swift death from the air and the shore! Where for them is sanctuary? Beautiful and unusual, they only ask to be let alone upon their chosen waters.

PYGMIES OF THE FEATHERED WORLD MEET

By Enid Michael

The morning of April 11 was delightfully sunny, and Charles and I were resting in Parallel Park after an early morning walk. Near where we sat stood the black oak in which a pair of Pigmy owls had had their nest the previous season. As we had seen a pair of owls in this tree several times lately, it seemed probable that the birds were nesting here again. The owls had occupied a cavity high up in the main trunk that had originally been dug by a California woodpecker and used for his nest. Now there was a fresh hole a little distance above the owl's old doorway and we thought perhaps the owl was using these new quarters. From time to time we glanced up at the two excavations with the

hope of seeing the owls.

Once upon glancing upward I exclaimed: "There is a Callope humming bird darting back and forth in front of the owl's old nest."

"The little rascal," said Charles. "He is calling to the owl, 'You big bum, come out and fight!'"

Presently a round feathered face looked from the doorway of the old home and then withdrew. The soft quavering note with which a father owl calls his lady came to our ears. 'Twas the signal with which he summons her when he is bringing her his kill. The little owl flew out from the nest hole then, and something long and lank dangled from his bill. As he alighted on a limb close at hand a second owl joined him and to her

he passed what he carried in his bill. The hummingbird was in close attendance, darting and flashing about the owls. It showed no bright gorget and we decided it was a lady hummer, the first to arrive in Yosemite this spring season. The owl with the lizard, as we made out the dangling object to be, flew to an adjacent limb and commenced to devour the gift of her lover. Audacious and persistent, the hummingbird would launch her attack at first upon the lady owl at her feast and then upon the male bird, perched upon the father side of the spreading oak crown. Once during this time the male owl moved over

to the feasting lady and the mating act took place. The hummingbird was witness to the performance, continuing her harassing activity the while. After this the male owl resumed his perch on the far side of the oak and again the hummingbird divided her time between them. After about ten minutes, however, she left the oak, making a straight dive for Indian canyon. Without doubt after this hostile demonstration against the demon of the feathered world she sought solace of the manzanitas, whose broad crowns now spread with countless clusters of pink bells, offer her meat and sweet drink.

A STRANGE FLYCATCHER.

By Enid Michael

On the afternoon of August 20, 1928, while following a path which leads through the wood bordering Tenaya Creek, my attention was attracted by a strange bird call. As I listened I thought the call-note might be that of an Audubon warbler speaking in an unusual manner and, if not an Audubon, some bird that I did not know. The wood here was a mixture of conifers, maples, and dogwoods. The bird was up rather high in a Douglas spruce, judging by the sound. A brief reconnoitre brought the bird within my range of vision and it became apparent at once that the bird was a flycatcher.

Squeakings brought immediate action; the flycatcher dived down to investigate. I spent some time with the bird, and on several occasions managed to coax it within a dozen feet of me. It was smaller than a Traill flycatcher, darker on head and back; there were no con-

spicuous markings of any sort and apparently no white eye-ring to give that wide-eyed appearance of the Traill. Its under body was grayish white rather than pure white. It had the up-flecking tail movement of the Black Phoebe and a prominent crest. Also in silhouette, in mannerisms, and in general color scheme it was remindful of the Black Phoebe.

It was, however, much faster of wing than the Black Phoebe, and it could dive, dart, swoop and turn more efficiently than the much larger flycatcher. The call-note was uttered every few seconds, and I decided to remember it as a cross between the single whist note of the Traill flycatcher and the call-note of the Audubon warbler. The note was not as soft as the Traill's nor as sharp as the Audubon's.

The strange flycatcher of Tenaya Creek was in a heavily shaded wood and was foraging from perches

twenty to forty feet above the ground. Although no Western flycatchers were seen in the neighborhood of the strange flycatcher, it is a locality much favored by them during the months of May, June and July.

Here, then, we might suppose that we had a flycatcher with tastes similar to those of the Western flycatcher—that is, a flycatcher who preferred the densely shaded woods rather than woods that border open spaces. But on the mornings of the two following days this same sort of a flycatcher, with the same simple call-note, was found foraging from the oaks and coffeeberry bushes in that hot section of the valley that spreads out at the mouth of Indian Canyon.

What species of flycatcher was this tiny fellow? I do not know. I may never know his name, but I have a feeling that I shall know his call-note when we chance to meet again.

During the late summer many of the nesting birds of lower elevations take part in an up-mountain movement and this post-nesting migration is likely to bring strangers into Yosemite valley. Possibly the little flycatcher was a bird of the lower country that was swept into

the valley with the up-mountain wave.

I told my story of the strange flycatcher to a friend of mine, who was an ornithologist, and more or less familiar with the birds of Yosemite, and he expressed surprise that I did not know the bird. He said, why not the Wright flycatcher? And he was even more surprised when I said that I did not know the Wright flycatcher.

"Why, I know the Wright flycatcher," he said.

And I said, "I know the Wright's here, but so is the Hammond, and the trouble is they look so much alike I can't tell them apart."

He then confessed that he did not know the Hammond. Which to me was an admission that he knew neither one. When two birds look so much alike that they can hardly be distinguished in the hand, how can one be sure that he knows one unless he knows both?

These two tiny flycatchers, the Wright and the Hammond, are common above the rim of the valley but seldom seen on the floor of the valley. I have a notion that if I were to live with them beyond the rim for a summer I could learn to distinguish them by their call-notes

WHIRLIGIG AND WATER-BOATMAN

By Eva May Hyde

One of the most interesting water beetles we have here in Yosemite is the Gyrinidae, if you wish to call it by its formal family name, or whirligig as its acquaintances call it.

The whirligig always attracts attention, for it makes graceful curves around and around in the water, much as an expert ice skater

does on ice in the winter.

Like humans, these beetles prefer to gather in numbers. When caught, they exhale a very decided odor. Some say it is very disagreeable, while others claim that it smells like mellow apples.

Although these insects are hardly ever seen out of water, they can fly, as a friend of mine has testified.

He was painting a boat on the shore of a lake, and one morning when he returned to the boat, he found it literally covered with whirligigs, sticking in the fresh paint.

They feed on insects that fall in the water. Another interesting feature about these beetles is that their eyes are divided by the margin of the head; so they seem to have two pairs of eyes, one looking up and one pair down.

The eggs are small, round, and placed side by side on leaves of waterplants, and the larvae, when hatched, look like small centipedes. When the larvae are full grown, they leave the water and spin a paper-like cocoon attached to some nearby object. The adult emerges in about a month.

A water insect that looks something like the whirligig is the water-boatman. But the water-boatman is a true bug of the family Corixidae.

The water-boatman swims with a

quick darting motion and uses for this purpose its long oar-like hind legs.

The bodies of these insects, when swimming, are almost covered with an envelope of air and when in pure water they do not need to change this, but in impure water they must come to the surface for a new supply.

The food supply for these little animals is found in the ooze at the bottom of the ponds and in the chlorophyll of *spirogyra*, a minute water plant.

The egg cases are attached to stems of aquatic plants, and in Mexico and Egypt both the adults and eggs are used as food. In Mexico the natives cultivate a sedge that is made into bundles and floated on lakes. When these bundles are covered with eggs, they are taken out, dried and beaten over a cloth. The dried eggs are then made into flour.

The adults are captured with nets at night - they leave the water.—

THE LOST ARROW TRAIL

By Harold E. Perry

For the out-of-door lover who thirsts for a quiet, restful, and accessible retreat in which to become attuned with the regenerative soul of nature, Lost Arrow Trail affords happy possibilities. Winding gracefully among tall tree-spires of a lovely, natural cathedral, it carries its visitors from one refreshing surprise to another. Rustic bridges bear their pilgrim travelers across tumbling waters, still laughing gleefully about the thrilling experience of having leaped from the rim of the valley. Choir balconies are nestled along the leafy aisles in this cathedral of the out-of-

doors, and feathered members touch chords of harmony which echo and re-echo through shady recesses from the moment dawn extinguishes the starry candles of night until the hour when evening lights them again.

Among the more numerous members of the feathered choir are western wood pewees, Sierra juncos and Sierra creepers. These busy bodies may be seen and heard on almost any part of the trail as they help to enrich the volume of nature's music. Some of the less conspicuous members are spurred towhees, western tangers, moun-

chickadees, various warblers and many others, who play their parts to the fullest. If one listens very attentively and is fortunate, he may be privileged to enjoy the rich coned melody of a russet-backed thrush or a warbling vireo. Then he will understand why birds have been given the heavens in which to live.

As one wanders leisurely along the Lost Arrow Trail, he is fittingly reminded of two faithful pioneers who worshiped in this same majestic cathedral long years ago. John Muir and Galen Clark came early to this nature shrine with true appreciation and genuine love. As one pauses to rest on the spacious

seat which has been dedicated to Galen Clark and meditates upon the bronze tablet which marks the site of a cabin built and occupied by John Muir, his fancy brings him into communion with both of them, for he is quite certain that their spirits would not wander far from a shrine so perfect.

As one continues to follow along the leafy and shaded aisles to their outermost limits, he is conscious that his soul has grown richer for having thus communed with nature and with two of her early lovers. He will come away with golden memories through which he will be enabled to return at will and worship along the Lost Arrow Trail.

AMPHIBIAN APPETITES

By Ralph Teal

The exhibit of Yosemite reptiles in the vivarium cases at the rear of the museum building is a source of considerable interest to museum visitors. The collection now on exhibit contains a small rattlesnake, two very beautiful coral king snakes, two rubber snakes, two giant garter snakes and four of the smaller species of garter snake, two adult or "red-headed" western skinks, an alligator lizard, and an immature and a full-grown blue-bellied lizard. Earlier in the year we were fortunate in having a ring-necked snake, a reptile only twice before described from Yosemite, but this disappeared a short time ago. In addition, two female Yosemite toads and a very young Pacific newt are displayed. Though typical, this is by no means an exhaustive collection of Yosemite's reptilian life.

Recently one of the coral king

snakes shed its skin during the night and presented itself the next morning with a shiny new coat. One of the garter snakes, not to be outdone, shed a portion of its skin in the presence of an admiring crowd of visitors and with the assistance of Mr. Selby. A few days later one of the larger of the garter snakes gave birth to nine living young. At the end of their first week of life all nine are thriving. The feeding of the rattlesnake has been described previously. But of all the interesting habits observed perhaps nothing has been of such great interest to visitors and nature guides alike as the swallowing of the immature blue-bellied lizard by one of the Yosemite toads. The toad is only about two inches long, the lizard about four from tip of nose to tip of tail, but recently Mr. Selby was called to the rescue of the lizard. He found that all but

the hind legs and tail of the lizard had been swallowed but he finally coaxed the toad to disgorge its strange meal and resuscitated the victim by washing him thoroughly. The next day the swallowing process was found to have been repeated except that even the hind legs of the lizard had disappeared, leaving only the tip of the tail protruding. The toad was somewhat reluctant about disgorging this

time, and the lizard somewhat slow about coming back to life, but both processes were ultimately accomplished. Needless to say, the two animals have now been put in different cases. It is interesting to conjecture how the toad may have caught the lizard or why it neglected the small newt which was in the same cage. Lizards have been observed to swallow frogs on a few occasions, but this reversal is something extremely rare

FRESH WATER YOSEMITE MOLLUSKS

By Florence Anne Summer

The phylum Mollusca includes invertebrates with soft bilaterally symmetrical and unsegmented bodies protected by a shell. The mollusks are divided into five classes, two of which are represented in the fauna of the fresh water ponds in the Yosemite Valley. These two representatives, the fresh water snail of the class Gastropoda, and the small bivalve of the class Pelecypoda, are found on the vegetation in the shallow water along the edge of ponds such as that in Sentinel Meadow near the old Yosemite village.

This bivalve has the common characteristics of its class: A soft body protected by two symmetrical, opposing valves united above by an elastic ligament; a simple opening at the anterior end of the body which serves as a mouth; and an ax-shaped mass of muscular tissue called the foot, which extends from the shell and helps in locomotion.

The animal breathes by means of a pair of gills suspended on the sides of the body. A soft mantle encloses the body and secretes the shell along its outer margin. In the mantle are two openings,

through which the water is circulated by means of hairlike structures called cilia.

Our Yosemite bivalve belongs to the family Sphaeriidae, genus *Musculium partumeium*. It has a small delicate white shell highly polished and about one-half inch in diameter. On each side of the hinge of the shell is a raised place called the beak.

The food of the animal consists of organic material carried into the mantle cavity with the water and driven into the mouth by the cilia.

The Pelecypods have an interesting life history. Eggs pass into the gills of the female and are fertilized. They then undergo division and pass through several stages, finally forming a larva which has a bivalve shell. This larva is either free living or parasitic.

Some of the larger members of the class are of considerable economic importance. Such forms as the fresh water mussel are used in the pearl button industry, while the shipworm and other marine borers cause great damage in certain localities.

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Dan Anderson