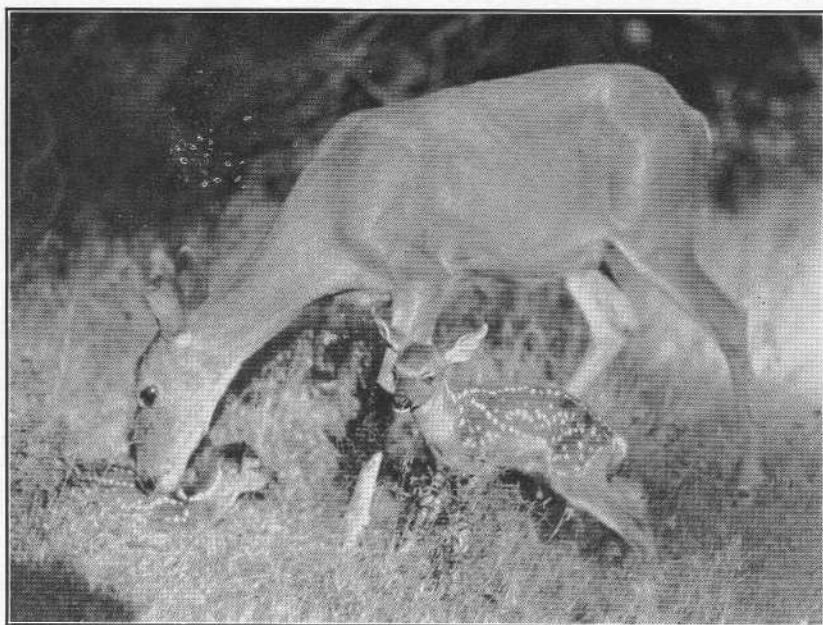


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Yosemite Nature Notes

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OYSTER SHELL SCALE IN YOSEMITE NATIONAL PARK

By Myrl V. Walker, Associate Park Naturalist

When the oyster shell scale was first discovered in Yosemite Valley is not definitely known, however, attention was called to its presence and destructive capabilities almost twenty years ago in a report prepared by members of the Forest Insect Laboratory, Stanford University, California. This report was based on observations made during the summer of 1928. In this survey the following statement was made regarding the importance of the oyster shell scale:

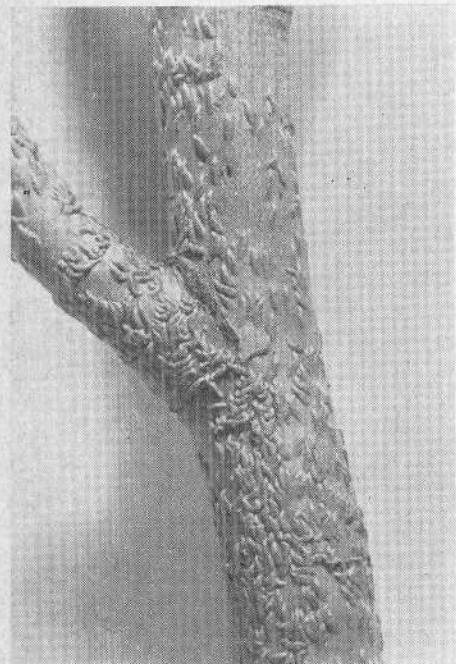
"The oyster shell scale is a serious enemy of fruit, ornamental and forest trees and shrubs throughout most of the United States. It has been reported as killing entire stands of ash and other trees in some localities. There is a heavy infestation in some parts of the Yosemite, and all evidence indicates that unless the pest is brought under natural or artificial control, it will kill most of the cottonwood, willow, and red dogwood on the floor of the Valley within the next ten years. Already numerous cottonwood, willow and red dogwood are dead, and many more are heavily infested and slowly dying. Both young

and old plants are killed. Infestations occur in all parts of the Valley from El Portal to Mirror Lake. Probably the most damage has been done at the mouth of Cascade Creek, in Sentinel Meadows and west of Yosemite Creek near its mouth.

"In one grove in Sentinel Meadows west of the giant yellow pine, 23 large cottonwoods are dead and eight are barely alive. At the mouth of Cascade Creek 52 cottonwoods are dead and 121 infested and practically dying. In the meadow across from the post office numerous young trees are infected. Large trees do not die suddenly but slowly, a few branches year after year. Some small trees die a few years after they become infested."

The oyster shell scale has been described as a "living pumping machine, which rests quietly on the bark and with its long beak inserted into the sap conducting organs beneath the bark, and pumps or sucks out the sap. Each scale does not get a great deal of sap, but when there are millions of them working side by side the drain on the plant is too great, and the vital, soft growing layers are injured so that they die."

It is rather difficult to describe the oyster shell scale so that it may be recognized by the average observer, but it is believed that the accom-



panying illustration is sufficiently clear to enable one to identify this scale. One writer gives the following brief description, "The oyster shell scale is readily distinguished from all other scale insects—by its peculiar shape and color, resembling a miniature elongate, curved oyster shell of a dark brownish bark-like color. The convex scale covering the body of the female is about 1/8 of an inch long and consists of two minute cast skins at the smaller end and a large scaly portion gradually se-

creted from the body of the insect underneath. The male scale is much smaller and rarely seen on fruit trees; they are often abundant on ash. Old lifeless scales often adhere to the bark for several years."

After discussing how this scale may be recognized on the trees, and how the scale injures the tree, the members of the Forest Insect Laboratory Investigating Committee made the following summary or conclusion:—

"The investigations carried on during the summer of 1928 indicate that at present there are two important insect control problems in the forests on the floor of Yosemite Valley . . .

The second problem is that of protecting the cottonwood, willows and red dogwood from the ravages of the oyster shell scale, which has come into the Valley and is very actively attacking and destroying many fine specimens of these native species of attractive shrubs and trees. Judging from what the scale has done in the past five years, we have every reason to believe that most of the cottonwoods will be killed in the next ten years unless adequate control measures are developed."

As a result of this investigation and in accordance with the recommendations, attempts were made to control the ravages of the oyster shell scale. It is evident, however, that control measures were not very effective in controlling the spread nor in reducing the destructiveness of this scale insect.

Another report which gives us

further information on the oyster shell scale in Yosemite Valley is an article on scale insects by E. O. Essig of the University of California, October 1928. Mr. Essig makes the following statement:

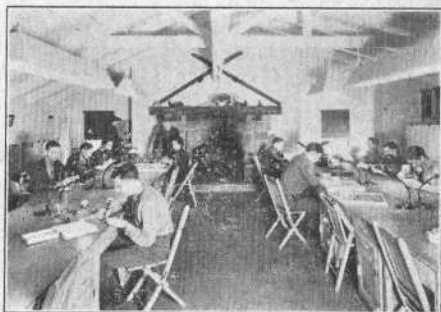
"The oyster shell scale, (*Lepidosaphes ulmi* Linn.), is exceedingly abundant on the willows and young poplar or cottonwood trees on the floor of the valley. In fact it often completely encrusts the branches of entire clumps of willows, many of which have been killed by the coccid. This scale was probably introduced into the valley on apple trees following the settlement of J. C. Lamon there in 1859 and J. M. Hutchings in 1864. Both of these residents, planted quite extensive orchards which are still in existence. While the scale may still be found on the apple trees of these orchards, it is by no means as abundant and destructive to the fruit trees as it now is to the native willows and cottonwoods."

A large number of references may be found descriptive of the oyster shell scale and its introduction, probably from East Asia, for it is not a scale insect native to North America. Like the San Jose scale it was introduced into the San Joaquin valley by early plantings of trees or shrubs brought over from East Asia.

It is interesting to note that even though the oyster shell scale was probably brought in on apple trees introduced into Yosemite Valley, the scale has since attacked other trees that now appear to serve as a better host plant than the original one. In

a "History of Entomology" Essig calls attention to the fact that the oyster shell scale was attacking other trees besides the apple in Yosemite Valley, and he makes the following statement:

"This scale insect was introduced into the Yosemite Valley on apple trees at an early date and has thrived unusually well. It has also attacked the native poplars and willows severely, and during the summer of 1928 I noted most of the willows growing on the Valley floor completely encrusted and many clumps entirely killed by the insect."



Further reference to the oyster shell scale in Yosemite National Park may be found in the report by the Yosemite School of Field Natural History for the summer of 1939, when they reported on the presence of this scale in the Swamp Lake area north of the Tuolumne river. In 1938 Mr. Joseph Dixon had noted aspens in this area being attacked by the oyster shell scale, but he stated that only a few of the trees were losing their leaves and that the scale, although

present, was not abundant. Within the year it is apparent that the scale had made rapid progress, for many of the trees examined in 1939 were heavily infested and were being killed quite rapidly.

In the report of the Yosemite School of Field Natural History for 1940 the following report was made on the oyster shell scale infestation at Swamp Lake Meadow:

"The progress of the scale during the past year seems to have been very rapid around the southern margin of the lake. At the present time only 20 trees out of approximately 50 over ten feet in height are still alive, and these show life only in the uppermost branches. The largest group of living trees, 35, is found at the north-east end of the lake. This grove, which is about 15 by 60 feet, contains a few dead trees, but the scale has caused the loss of all the leaves except at the tips of the upper branches."

In the report of the Yosemite School of Field Natural History for 1941 additional observations were made on the oyster shell scale in the Swamp Lake area as follows:

"A careful study of the relationship between the oyster shell scale and the quaking aspen was made to determine the ecological changes which have occurred since the 1940 study of this problem. In the northeast part of the meadow the upper one-third of 15 mature trees still retained some foliage and the bark is intact but cracked and entirely covered with scale. Three mature trees which still contained life were noted in the southeast corner of

the area. Of these one was prostrate and retained foliage at its tip. A second held life only in the central portion. The third was standing, but with the exception of the uppermost extremities it was nearly dead."

The presence of oyster shell scale on trees and shrubs in the wildflower garden back of the Yosemite Museum has been noted for several years, and an attempt has been made to control it in the garden. A recent survey of the trees and shrubs around the Museum and in the wildflower garden reveals that the oyster shell scale is present on a variety of plants and that it is making progress in spite of the present methods of control. Some of the shrubs with particularly bad infestations at the present time are the redbud just outside the Museum door on either side of the walk. The scale may be observed on several branches, and there are a number of the main stalks or stems with a diameter of one and one-half to two inches that are literally covered with the scale. It is apparent that these branches will surely be killed in a short time."

In the many reports of host plants for the oyster shell scale there are long lists of trees and shrubs, but in no instance have I been able to find where the redbud has been listed as subject to attack by the scale. If the shrubs by the Museum are any indication of the present trend of this scale in attacking redbuds, there is reason to believe that all redbuds

will soon be destroyed within the very near future.

In the wildflower garden this scale is present on the ceanothus, quaking aspen, cottonwood, and willow, but past efforts to control it in the garden have thus far been successful in preventing its spread to the alders, which in other areas have been completely destroyed. Some very bad infestations occur on quaking aspen and willow, and one young willow tree with a diameter of nearly three inches has been killed by the scale.

When the early settlers in Yosemite Valley planted small apple orchards, they little realized the great changes that would be brought about in the Valley simply because of the introduction of the apple trees. The space occupied by these small orchards did not interfere to any extent with the area of the Valley occupied by the native trees and shrubs, however, the introduction of these trees which were, quite unknown to the early settlers, hosts to a very prolific scale insect, did bring about an unpredictable alteration in the condition of the native flora.

Had those early settlers known of the destructive capabilities of the scale insect which they inadvertently introduced, they would no doubt have gladly sacrificed the pleasure of a few eating apples in order to preserve the native trees and shrubs which were so much a part of the original beauty of Yosemite Valley.

On the other hand, it is now apparent that little could be gained today by the elimination of the apple orchards, for the apple trees no longer serve as a major host plant for the oyster shell scale.

Many observers have been interested lately in the changing conditions in Yosemite Valley, particularly in regard to the change in meadow growth, open vistas, and encroachment of cone-bearing trees upon the former open vistas and so called meadows. It is evident that the attacks of the oyster shell scale on willows, red dogwood, cottonwoods, alders, and ceanothus that once formed the borders of the meadows has been to a certain extent responsible for this change. Although it is well known that shrubs were occasionally "cleared" from the meadows, such clearing was probably of minor consequence in the destruction of the dense, brushy areas along the streams or the brushy areas bordering the meadows along the margins of the forests of oak and pine. These dense patches of shrubbery no doubt once served as a barrier or buffer zone to the encroachment of the oaks and conifers, but their destruction, accounted for at least in part by the oyster shell scale, has opened the way for the oaks and pines to get a start in the "open vistas" that were once present in Yosemite Valley.

THE ARTIST'S YOSEMITE — AN APPRECIATION

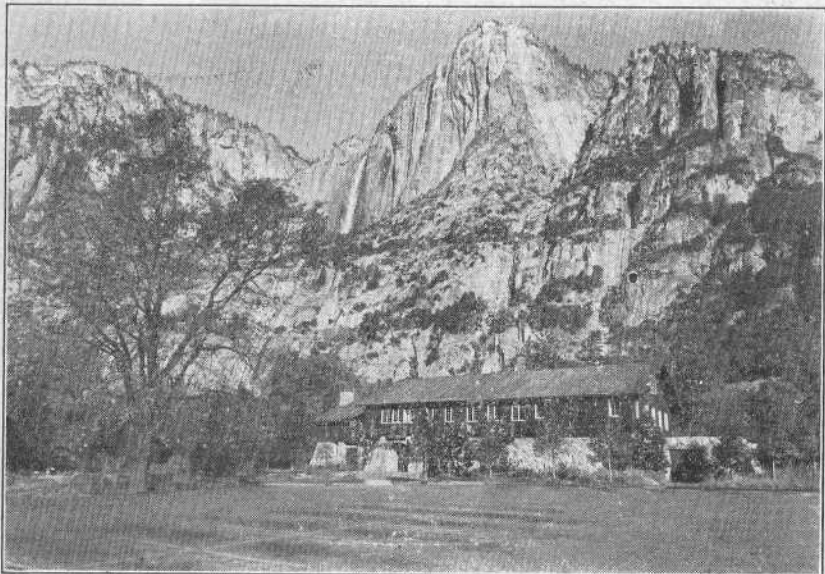
By Marion William Batchelor

My visits to the Yosemite have been in the late summer and early autumn. I have not yet seen the sun inscribe its yearly log from solstice to solstice. Yet a visit under favorable auspices may leave a unity of impression which falls into a natural perspective and which might be lost by a longer sojourn.

Within the stone, vine-draped portals of the Museum, I like to study a certain canvas by Bierstadt. Therein I see a drama unfolding—a stretch of water; a night fire in the distance; huge rock formations rising like stupendous bastions, rising toward portentous clouds, through which breaks the moon, full and forboding. The picture, painted many decades ago,

shows technical knowledge and the influence of careful training. It shows also the effect of a new subject, wild and untamed.

But I never fully understood the picture until one September night, the moon little short of the full, I entered a meadow, its late summer dryness easily supporting a quiet tread, to feel a new, chill layer of air, born and perfumed by ritual since sundown. All the landscape was simplified in the vague light; the great south walls sculptured into awesome aspect by successive lunar beams, the moon itself just skirting the rocky rims. From the depths of wooded shadow, remote and baffling, came the notes of an owl. Then Bierstadt



spoke — for comprehension had come. I understood what he saw and felt. I paid homage to one who, when travel to reach this place was itself an arduous task, laden with equipment, wandering day after day in this fantastic land, by night sought shelter and fire near giant lichened rocks or some aged, incense-laden tree. So it was, too, with men like Keith and Moran. Their spirit pervades the place. They knew its awesome peaks, fanned by the winds; its valleys, warmed by a merciful sun; color now strained to its highest key, now scattered in atmospheric vagueness.

The lines in Stevenson's essay on Fontainebleau could have been written for the Yosemite, as the deepest meaning of forests and mountains is much the same everywhere:

"It is a place that people love more than they admire. The vigorous forest air, the silence, . . . the wildness of tumbled boulders, the great age and dignity of certain groves—these are but ingredients, they are not the secret of the philtre. The place is narrative; the air, the light, the perfumes, and the shape of things, concord in happy harmony. The artist may be idle and not fear the "blues." He may dally with his life. Mirth, lyric mirth, and a vivacious, classical contentment, are of the very essence of the better kind of art; and there, . . . he has a chance to learn or to remember. A larger air, a higher heaven, something an-

cient and healthy in the face of nature, purify the mind alike from dullness and hysteria."

"The fact of its great age and special beauty further recommends this country to the artist. The field was chosen by men in whose blood there still raced some of the gleeful and solemn exultation of great art. . . "

"In this continual variety the mind is kept vividly alive. It is a changeful place to paint, a stirring place to live in. As far as your foot carries you, you pass from scene to scene, each endeared with sylvian charm, each vigorously painted in the colors of the sun. The air, which is cooled all day in crypts of underwood, the incense of the resin, the listening silence of the groves, the unbroken solitude, the sunlit distance, the scurrying of woodland animals, the shadowy flitting of deer, and that hereditary spell of forests on the mind of man who still remembers and salutes the ancient refuge of his race—legend and sight, sound and silence alike gratify and stimulate the heart."

It is for you, artists, to comprehend this poetry of life and earth. If you do not, then discard your colors and brushes; they will be of no use.

To you who are not artists, enjoy this great al fresco school where we can learn all our lives. When you are surfeited with the valley, slip your packs over your shoulders and take to the trails. Nature, with her inexhaustible secrets, will reward your effort.

AN INTERESTING BUTTERFLY MIGRATION**By C. Frank Brockman, Park Naturalist**

About June 10, for a period of approximately three days, Yosemite visitors were treated to a spectacular migration of California tortoise-shell

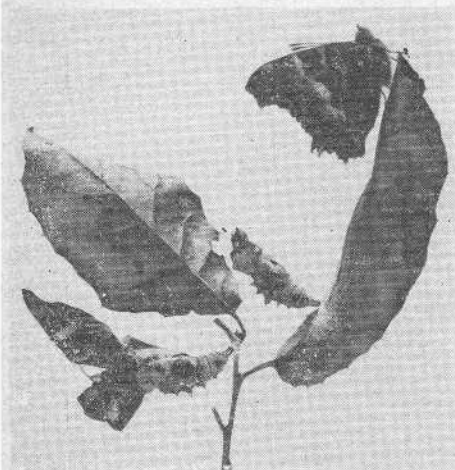


Photo courtesy of E. O. Essig

butterflies (*Nymphalis californica*).

As noted in "Butterflies of California" by J. A. Comstock (pp. 127-130) this swarm of California tortoise-shell butterflies was not, in a true sense, a migration. This species is one of several that may over-winter as adults or as chrysalids. Since caterpillars and chrysalids are often heavily parasitized, the abnormal increase in numbers of this insect which occurs periodically is proba-

bly the result of a reduction, for some reason, of the parasites that usually hold them in check. When the preferred food plant, in this case various species of *Ceanothus*, has been largely stripped from a given area, the adults in emerging from the chrysalis are forced to fly to other areas where a sufficient food supply is found before laying their eggs. Often the caterpillars are so abundant that they strip the foliage from the *Ceanothus* over wide areas, and it is interesting to note that such was the case in the Mariposa region below the park boundary previous to this migration.

This butterfly is one of the most common in the western mountains being distributed from the Rockies to the Pacific Coast. According to Professor E. O. Essig of the University of California swarms such as observed here last June are not uncommon. Regions in California which are especially characterized by such large scale, periodic dispersal or migratory swarms are those in the vicinity of Mt. Shasta, Mt. Lassen, Lake Tahoe and Donner Pass, American River, and Yosemite. Professor Essig also states that this species is occasionally abundant in the Coast Range of middle California.



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Dan Anderson