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FIELD
SCHOOL



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THE YOSEMITE SCHOOL OF FIELD NATURAL HISTORY

C. A. HARTWELL

Park Naturalist

The Yosemite School of Field Natural History is a summer school for the training of naturalists, government ranger-naturalists, and teachers of natural history, where emphasis is placed on the study of living things in their natural environment.

PURPOSE

Its aim is to train students to study and interpret living nature, that they may better enjoy life and also lead others to similar profit and enjoyment, thus making an educational contribution to the conservation of natural resources.

The establishment of the Yosemite School of Field Natural History resulted from a demand for a training in field studies and a desire on the part of the National Park Service and the California Fish and Game Commission to establish a training school for ranger-naturalists, teachers of natural history and Boy Scout and Camp Fire Girl leaders looking toward better knowledge of wild life and its conservation. This school seemed a natural outgrowth from the now well-established Yosemite Ranger-Naturalist Service.

RESULTS

From its beginning in the summer of 1925 both instructors and students have been pleased with the

outcome of the venture. Students speak of the work as being the most useful and profitable they have ever taken. The instructors are convinced that the emphasis on field studies develops enthusiasm and constitutes a needed supplementary training. Students of past seasons have made good use of their training during succeeding years and many have found places as naturalists or nature councilors in summer camps and in National and state parks.

From the first, applications have exceeded the quota of students, and now that the school is better known it is possible to admit but a fraction of those who apply. As a consequence, advance enrollments for future seasons are being received. The demand for naturalist leaders continues to exceed the supply.

LOCATION

With easy accessibility to its extensive fauna and flora, typical of five life zones, and its unique geology, Yosemite National Park constitutes an ideal location for a school of field natural history.

Headquarters are maintained at the Yosemite museum, a National Park Service institution. Its extensive collections are available to students, and its library, lecture room and well equipped laboratories af-

ford the best facilities for intensive work

This will be the seventh session of this popular school in the mountains.

TERM—The session will open June 22 and will terminate August 7, thus coinciding with the University of California summer session at Berkeley. The high mountain field trip begins July 31 and ends August 7. This matchless excursion terminates the work of the season.

ORGANIZATION—The school, a part of the Yosemite educational department, is under the administration of the superintendent of Yosemite National Park. The work

work with weekly reports of progress.

N. B.—Several mountain miles are covered in various field excursions, and the Saturday trips necessitate a climb of 3000 feet.

LECTURES AND LABORATORY

1. Geology and physical geography of the Sierra Nevada.
2. Plant and animal distributions; life zones.
3. Botany—(a) common trees and shrubs; (b) forestry; (c) flowering plants; (d) algae and fungi; (e) ferns and mosses.
4. Zoology—(a) invertebrates insects, molluscs, etc.; (b) common vertebrates: fishes, amphibians and

DAILY FIELD TRIPS OF UNENDING INTEREST



was originated by the California Fish and Game Commission and brought to Yosemite in 1925. The Yosemite Natural History Association also co-operates with the government in employing staff members.

FIELD STUDY—Field trips for the study of fauna and flora of the valley floor and for first-hand study of subjects covered in lecture room and laboratory will be taken daily.

2. All-day field excursions each Saturday to the "rim" of the valley.
3. Special collecting walks for rarer forms of plants and invertebrate animals.

4. A special problem, selected by the student and necessitating field

reptiles, birds and mammals.

5. Conservation of natural resources.

DAILY PROGRAM

8 a. m. to 12 m.—Regular morning field trip. (Except Saturdays, Sundays and holidays).

2 p. m. to 4 p. m.—Lectures and laboratory.

Saturdays—All-day field trip to heights above valley, starting at 7 a. m.

Tuesdays, 8 p. m. to 10 p. m.—School camp fire. Informal program, open to the public.

The museum laboratories are open to students for study from 7:30 to 10 o'clock every evening, except Sunday.

HIGH COUNTRY FIELD TRIP

—On July 31 the class, under leadership of the director, will leave Yosemite Valley for eight days in the high regions of the park. The



High Sierra camps operated by the Yosemite Park and Curry Company will afford convenient and comfortable accommodations. Expense of this special trip will be approximately \$30. Opportunity will be given for observation and study in each of the three upper life zones of Yosemite National Park—the Canadian, Hudsonian and Arctic-Alpine.

WORK IS PRACTICAL — The plan is to make the studies supplement university courses in botany, zoology and geology with the opportunity for field work. The course affords first-hand study of nature; familiarity with living plants and animals, the lack of which many feel so keenly, will be stressed. Opportunity for practice in teaching, leading parties afield, speaking before campfire audiences, and in writing nature notes will be given every student.

EXAMINATION AND GRADES

Emphasis will be placed on intensive field work, and each student will be expected to know and

be able to identify the more common Yosemite trees, shrubs, wild flowers, insects, fishes, amphibians, reptiles, birds and mammals. Grading will be apportioned as follows:

- (a) Field observation and identification, 60 per cent.
- (b) Teaching ability, 20 per cent.
- (c) Notebooks, 10 per cent.
- (d) Preparation of scientific specimens, 5 per cent.
- (e) Familiarity with literature, 5 per cent.

CREDIT

The work offered is of university grade, but no university credit is given. A National Park Service certificate is issued showing that the work has been satisfactorily completed.

REGISTRATION AND MATRICULATION—The number of students in each summer session is limited to 20. Students are accepted on the basis of written application, showing training, experience and other qualifications for this



course. Application blanks are sent on request. Two years' college work or the equivalent are required.

All applicants are strongly urged to take membership in the Yosemite

its Natural History Association. "Yosemite Nature Notes," the periodical publication of this organization, places particular emphasis on field school activities. Members of the c.a.s.s., as well as the teaching



C. A. HARWELL

staff, are the chief contributors to its pages.

SMALL EQUIPMENT FEE — This school is a contribution to natural history education by the National Park Service, with the aid of the Yosemite National History Association. No tuition is charged. Text books, stationery, drawing materials and laboratory supplies are provided by the school. Expense is thus limited to a \$5 registration fee to cover sundry materials, such as reference books, collecting apparatus, etc., and to the student's transportation, food, housing and clothing.

GRADUATE WORK

Although it is not possible to allow students to re-enroll the year following graduation from the school, yet some have found it profitable to return for advanced work in following years. Use of equipment and direction by the staff are made available to such students.

Lectures and trips conducted by visiting scientists greatly enrich the program.

HOUSING—A section of Government Camp No. 19 has been set

aside for the group of 20 students. The government furnishes floored platforms for 9 by 9 foot tents, electric lights and hot and cold showers without charge. Unless other arrangement is made students will be assigned two to each tent. A tent for two, with house-keeping equipment, secured from the Yosemite Park and Curry Company, prorated costs \$7 per week up. Groceries and meat are to be had at practically city prices. A list of articles for rent by Yosemite Park and Curry Company will be sent all accepted students. Arrangements are made whereby all equipment is up and ready as students arrive. The camp is centrally located. Besides the school it houses the educational staff and the ranger naturalists. Free space is available in the same area for those bringing their own camp equipment. Students should bring their own bedding; it should be sent by parcel post, care of Yosemite Museum, preceding their ar-



PROF. E. O. ESSIG

rival. Any other personal effects should be sent by parcel post rather than by express.

CLOTHING

Outing clothes are in order at all times and places. Comfortable walking shoes are necessary, as field trips include excursions covering many miles of mountain trail.

Further information will gladly

be supplied by the National Park Service. Inquiries should be addressed to the Park Naturalist, Yosemite National Park, California.

STAFF—Harold C. Bryant, Ph. D., assistant director National Park Service, director Yosemite School of Field Natural History.

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E. O. Essig, professor of ento-

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Clifford C. Presnall, B. S., assistant park naturalist, Yosemite National Park.

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Staff of ranger naturalists, Yosemite National Park.

The California Fish and Game Commission, the Yosemite Park and Curry Company, and the Yosemite Natural History Association co-operate with the government in employing staff members.

Lectures and trips conducted by visiting scientists greatly enrich the program.

For the 1931 session 36 applications are in (Feb. 21) from 11 states. Final selection will be announced in March. Others should apply.

The Yosemite School of Field Natural History assumes responsibility for the management of the financial matters. All fees are payable to the Financial Secretary of the Yosemite Natural History Association, Yosemite National Park, California.



ALUMNI NOTES



FORMER STUDENTS IN NATURE WORK

Our one hundred twenty students during the past six summers have come from ten states and the District of Columbia, California of course predominating

These graduates are making fine contributions to natural history education. Some are working in National Park as Park Naturalists, Assistant Park Naturalists and Ranger-Naturalists. Some are Nature-Guides in State Parks, or in summer camps, some are lecturers, some are writers while all are great boosters.

An alumni organization is now being worked out.

REUNION IN MARCH

An Alumni Reunion will be held at Switzerland near Pasadena, the week-end of March 7th. Park Naturalist C. A. Harwell of Yosemite will be present. A jolly, good time is assured.

For reservations write Switzerland P. O. Box 179, Pasadena, Calif.





TRACKING IN THE SNOW

C. C. PRESNALL

Assistant Park Naturalist

Tracking wild animals through the snow is one of the most fascinating occupations of the naturalists in Yosemite National Park. Every footprint has a meaning, and a series of tracks usually reveal a dramatic and often tragic incident in the life of some wild creature.

Ideal tracking conditions were furnished recently by a light snowfall which, after remaining soft for three days, crusted over so as to preserve all the footprints that had been made. The number and variety of tracks were surprising. Eighteen were seen along the bridge paths between Mirror Lake and Tenaya Trail, a distance of only two miles. This did not include the dozens of deer tracks which formed a network everywhere.

All but four of the 18 tracks were made by gray foxes. This might lead one to think that the country was overrun with them, but a close study convinced me that the trails had all been made by three foxes, one large one and two smaller ones. They were traveling at a trot most of the time. In one place the big fox crossed Tenaya creek on a log which is often used by bears during the summer. A small fox crossed higher up by jumping from rock to rock.

At other places in the snow other creatures had left interesting autographs. Here a weasel had made

a rapid inspection of a half-dozen bushes in search of small animals and birds; there a fine squirrel had crossed our path in going from one food cache to another. A lone coyote had stopped on a high point to survey the lake, then trotted off towards the Royal Arches. A blue heron had flown down to a sandbar and walked sedately into Tenaya creek. Deer had ventured onto the thin ice edging the stream, then returned to the shore and crossed farther up over an unfrozen riffle.

STORY IN WILD LIFE

A drama of the woods was written into the snow near Mirror Lake. Two foxes and three deer had traced a story in footprints which I read as follows:

A large buck, traveling leisurely from Tenaya creek to the lower slopes of Half Dome, was suddenly surprised by two foxes close behind him. He jumped sideways landing eight feet away, then bounded down the slope for 50 feet and stopped to see what had alarmed him. The foxes, which had been trotting along 20 feet apart, came together and stopped to stare down at the buck. It was apparent that they were hunting together, since they met directly without circling cautiously around. It was also evident that they had not been stalking the buck; they had simply happened to overtake and frighten him.

After staring a while at each other, both deer and foxes continued quietly about their own affairs.

Soon afterward a doe and her fawn crossed the fresh fox scent and reacted to it in an entirely different manner. They had been descending from Half Dome to the lake quite unaware of the foxes that had passed just below them. Perhaps this had happened early in the morning when a slight down draft of air would carry the fox scent away from the deer, but could not carry a message from the deer to the foxes, since they had already passed by.

SIGNS OF EXCITEMENT

Strangely enough, the deer crossed the uppermost fox trail without stopping, but at the lower one they stopped in alarm. Yet this action was not so strange after all. They had crossed the first trail in the open where there was nothing but

snow for the scent to cling to. The second trail was encountered at a point where the fox had forced its way through some low brush, staining it with an odor that must have fairly screamed "fox" to the delicate senses of the deer. At any rate, they were greatly alarmed, jumping about in small circles. The fawn happened to make a dash up the slope to where the other fox had passed through the brush, then ran down to tell his mother. She apparently decided that one fox was bad, but two were terrible, so she took her half-grown baby back up the slope at top speed.

Neither the old buck nor the doe had felt any concern for themselves because of the foxes, but the doe had feared for the safety of her fawn. So it is always in the woods. Fear and hunger control to a great extent the actions of every animal. Yet very few animals ever show cowardice.

Notelets

THE SHINING TREES

By George C. Crowe
Assistant Park Naturalist

For several months the sunlight reflected through the trees on the south rim of the Valley has been transforming the pines and firs in a most dazzling manner.

When standing just within the shadow of the high granite wall one can see the trees, directly in line with the sun take on a halo-like radiance. Viewed through binoculars, every branch and twig glistens as though heavily encrusted with ice, or transformed into the clear-crystal.

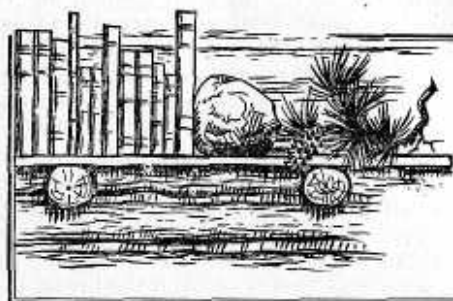
Visitors seeing the shining trees for the first time marvel at their beauty.

Occasionally the bugling call of the elk is still heard across the meadows.

The deer wintering in the valley keep to the north side, avoiding the cold shadows of the south wall.

A young juniper tree, about seven feet high, was found growing in Camp No. 16 last fall, far below its life zone.

One of Yosemite's summer visitors states that a week's sojourn in this wonderland was the greatest experience in his life, and he is coming back again, until he has visited the Valley each month of the year.



Book Notes

A FEW SUGGESTIONS

In response to repeated requests regarding books to own for leisure hours of nature study at home and on vacation trips in California, we hope a few simple suggestions may be helpful.

It is not at all necessary to have many books. Rather, one should possess such books as will answer authoritatively any questions which may arise in doing field work. For detailed research work, use may be made of the public library usually near at hand.



Trees

Forest Trees of the Pacific Slope by Sudworth; pamphlet of United States Department of Agriculture, Bureau of Forestry. Price 60c. Complete for trees and shrubs. Good illustrations of each twig, leaf and seed. Accurate descriptions.

Trees of California by Willis Linn Jepson; Students' Co-operative store, Berkeley. Price \$2.50. Is a working manual for the field and has 125 illustrations—lightweight.



Birds

Birds of the Pacific States by Ralph Hoffmann; Houghton Mifflin Company, \$5; teachers, \$4; 1927 edition. Ten colored plates, over 200 illustrations. Especially designed to serve in field identification. Convenient and valuable for purpose. Best to date for field work.



Insects

Insects of Western North America by E. O. Essig. Price \$10. The MacMillan Company. Most complete, accurate and usable book for field insect identification in California.

Flowers

A Yosemite Flora by Harvey Monroe Hall; Paul Elder & Co., San Francisco, \$2.50. A descriptive account of the ferns and flowering plants, including trees of the Yosemite National park; with simple keys for their identification; designed to be useful throughout the Sierra Nevada mountains. Is just what it claims to be. Is for flowers of the Sierra Nevada mountains what Hoffmann's birds is in its field.

Manual of the Flowering Plants of California by Louis Linn Jepson. Price \$7.50. Students' Co-operative store, Berkeley. A more complete work than the Yosemite Flora and as such the best to date for general field work, although for field work in the Sierra Region Hall's Yosemite Flora is more convenient, simpler, and complete enough for the purpose.



Animal Life in Yosemite by Grinnell and Storer. University of California Press. Price \$7.50. An account of mammals, birds, reptiles, amphibians in a cross-section of the Sierra Nevada. Written for field identification purposes and each study given is itself field study observations. Excellent to give conception of life zones and the mammal and bird indicators of each.



Handbook of Yosemite National Park by Ansel F. Hall. Covers the whole field of the history, geology, flora and fauna, together with explanation of life zones of the Yosemite National park, but the brief accurate accounts of the subjects treated are very helpful in nature study.

The students of the Field School will use these books for reference, along with others.

OUR WINTER WALKS

Bird Report for December, 1930

Enid Michael, Ranger-Naturalist

December in Yosemite valley started off with an overcast day, but in spite of the threatening skies Mr. Michael and I made a trip to the top of Nevada Falls, and although the sun did not break through until late in the afternoon we had a most enjoyable day.

This being the first day of a new month all birds noted were new ones for the December list. Sixteen different species of birds were seen during the day and of the 16, six belonged to the woodpecker tribe. This is not strange, however, as all the woodpeckers noted were resident species. We might have seen more kinds of woodpeckers, as there are five species that occasionally come in as winter visitants.

Very few birds were seen after leaving the floor of the valley Golden-crowned kinglets were the common birds both on the floor and above the r'm.

In the manzanita bushes on the flat between Vernal and Nevada Falls a pair of wrentits were seen. A strange thing about the wrentits is that they are common in the chaparral below the park boundary at an elevation of 2000 feet, they seldom occur on the floor of the valley, but 2000 feet above the valley floor, in certain brush-covered slopes, they are found all the year round. In other words, they are resident at 2000 feet and resident at 6000 feet, but not resident at 4000 feet. They stick close to their ecological niche.

December 2 also started off with overcast skies, but the sun came out to drive away the clouds and the day was almost balmy. Today

we walked along the Sun trail and came back by way of the orchard. The first new bird for the December list was the Hutton vireo, who was encountered on the sunny flat at the mouth of Indian canyon. Here also was found the mountain chickadee. A lone robin was found in the orchard and then came the piping call of the little sparrow



hawk as he flew over the Sentinel meadow. Now we have so early in the month 20 birds listed. Thirty seven is the average number of species noted for December for the last 10 years; only 17 more species to bring this month up to the average.

JAY AND HAWK MIX

The day of December 7 started

off most propitiously. I had just stepped from the door when I saw a dark winged streak glide swiftly aslant across space; then came a thud, an explosion of soft feathers and a chaos of flopping wings as jay and hawk rolled locked together on the ground. The jay had attempted to rise, but was struck down when barely lifted from the ground. As hawk and jay rolled over, feathers floated in the air above the struggling forms. An agonized shriek rent the air and screaming jays from all directions came dashing to the scene. The hawk had failed to strike a vital spot. The squawling jay appeared to be held by one leg and amid the confusing hubbub he managed to break free and, with wobbling, uncertain flight, he made his way to safety in the heavy foliage of a nearby cedar. The hawk shook out his bedraggled feathers and winged straight away, to escape the curses of the enraged jays who had gathered about him. On the ground there was left a scattering of soft breast feathers to mark the scene of the near tragedy.

The day that started off with adventure was not yet over. The rays of a late afternoon sun came at a long slant across the tawny meadow. With a companion, I wandered along the river bank. The leafless willows, red and yellow, mirrored an enhanced beauty in the still river pools. Silence of the long shadows, silence of the reflective pools seemed to hush the valley with a serene peacefulness. Tracks—silent tracks of the great blueron—marched a trail across the sand. A stately bird had walked leisurely, indicating complacency by the drag of each long middle toe, which left a message of leisure in the sands.

WATER FOWL SEEN

We, my companion and I, felt the mood of the moment as we walked

slowly and silently along the sandy shore. My companion halted and stood motionless, except for a slight gesture of the hand which was to focus my gaze on a beautiful sight. Across the river pool, in the shadow of the bank, were four Mallard ducks. We were observed; the ducks lifted their heads high, and gazed nervously about. Even in the shadow the males' heads gleamed dark violet-green and as they moved their heads we could catch the glint of their white collars. As they turned about, swayed by the current, they showed the Mallard curl of tail feathers. We watched them for several minutes and we wondered which bird of the four would take to the air first. My companion said that one of the females would lead off. This statement, however, was not proven, for as the birds settled, apparently satisfied that all was well, we had not the heart to disturb them, and so moved back across the sands.

On Monday, the 8th, came the first December day of absolutely cloudless skies. We were off for an all-day ramble on the floor of the valley, and to avoid the chill shadow of the great south wall we kept close to the base of the north wall.

KINGLETS AND CHICKADEES

To date, 32 species of birds had been listed for the December report and we hoped to add several more names to the list. About Indian canyon none but the usual birds were seen, and farther down the valley birds were almost entirely lacking. We did, however, come onto a company of small birds in the pines that stand park-like about the flat at the foot of the Yosemite Falls trail. In the company was a flock of 10 or 12 golden-crowned kinglets, two ruby-crowned kinglets, a pair of mountain chickadees, a couple of Sierra creepers and a pair of red-breasted nuthatches. During the winter months in the

Yosemite Valley the above mentioned birds are often found loosely banded together. Whether for company or for mutual protection it is hard to say, but, in any event, such little companies are not unusual.

Most of the birds were busy feeding and chatting, but the thrifty



CHICKADEE

little nuthatches were storing away food against the rainy days that are yet to come. They would swing on the opening pine cones, pluck a nut out by the wing, send the seed wing fluttering down, and carry the nut away to tuck it in some cranny in the bark of a great pine.

On the morning of December 14 we, Mr. Michael and I, had a visit with "ladderback" that delightful little woodpecker from the district of blue oaks and digger pines. Like the Western bluebird and the hot-ton vireo, the Nuttall woodpecker is a resident bird in the upper Sonoran zone, and like these birds he seldom finds his way into Yosemite Valley except during the winter months. Ladderback was foraging on the trunk of a yellow pine and in his search for food he was prying off scales of bark in the manner of a white-headed woodpecker.

On the morning of December 15 we were perched on a ledge about 300 feet above the floor of the valley. We were looking down when suddenly there swept across the meadow the shadow of a great bird. Of course we thought eagle, but in a moment we discovered the author of the shadow, who as it turned out was our old friend the red-tailed hawk, who but occasionally visits the valley. We wondered what the red-tail could be looking for in the valley at this time of year; the ground squirrels and snakes are all in hibernation and other small mammals such as would suit his taste are indeed rare at all seasons.

ON A FRIGID MORNING

The morning of December 17 the thermometer registered 20 degrees; this was the coldest morning so far this month. The walk today took us to the foot of Yosemite Falls and back by the way of the orchard. Eight band-tailed pigeons were taking the first of the morning sunshine on their favorite roost in the dead top of a cedar. The little band probably constitutes the entire pigeon population of the valley. In the woods along the Lost Arrow trail three varied thrushes were calling to one another. These were the first varied thrushes to come to our attention this month, and they brought the number of species noted for the month up to 38. For the second time this month siskins were seen in the alders along Yosemite Creek. Today there were only two birds. Fifteen species of birds were seen during the hour's walk, which is a goodly number for this time of year. During these short days the sun just bumps along the south rim and the shadow of the wall reaches far across the valley.

The next new species for the monthly list came on December 26, when six ring-necked ducks were seen on the river just above the

Sentinel bridge. Owing to the long unbroken stretch of freezing nights much of the river surface was frozen over and the ducks were forced to forage in such open water as they could find. However, as we watched them they appeared to be finding food. They were diving and bringing up mud from the bottom of the river. Occasionally one would bring up a pebble which it would roll about in its mandibles before tossing aside. The ducks may have been feeding on tiny clams which are abundant in the oozy mud of the river bottom.

On Monday, December 29, an all-day trip was made to the north rim of the valley. Our route took us up Indian canyon, along the east wall of Indian canyon and back to the valley by the way of the "Plute Trail" In the cool shaded canyon bottom on the way to the rim the only birds noted were small flocks of golden-crowned kinglets and three or four lonesome ruby-crowned kinglets. When we were eating lunch a flock of 20 western

bluebirds flew overhead. And a little later in the open woods we saw several mountain chickadees and a pair of red-breasted nuthatches. We also heard a Townsend solitaire and a white-headed woodpecker. On our way home on the sunny south-facing slopes we routed out a flock of about 20 mountain quail and a pair of Sacramento towhees.

On the last day of the month the long stretch of clear weather was broken and the year came to a close with a mixture of rain and very wet snow.

During the month 40 species of birds were noted, which number is three above the December average for the last 11 years. Of the 40 different species of birds there was not a single one that was not to be normally expected in the valley during December.

Owing to the long unbroken stretch of fair weather the minimum temperature for the month was probably below normal for it is during periods of storm that the thermometer rises and this month we had no storms.



LECTURE DATES

Park Naturalist C. A. Harwell will give an illustrated lecture "Birds from Sierra to Sea" on the following dates, while in Los Angeles.

Averill Study Club March 3 3 P. M.

South Pasadena Womens Club March 4 11 A. M.

Agassiz Nature Club March 4 7:30 P. M. Long Beach.

California Audubon Society March 14 7:45 P. M. At the Los Angeles Public Library.

Mr. Harwell will also speak at several Public Schools.



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Dan Anderson