



# TORREYANA

---

Published for Members of the Torrey Pines Docent Society, #100, Oct., 1983

---

NEXT DOCENT MEETING: Saturday, October 15, 9:00 A.M., Lodge

Dr. Boyd Collier and Dr. Hanscom from San Diego State U. will give a slide and talk presentation on "The Ecology and Interactions between the Harlequin bug, Murgantia histrionica, and the Bladder pod, Isomeris arborea." The research on these two species has been carried out at Torrey Pines State Reserve.

---

## *Report from the Ranger*

Good news! Bob Wohl will continue as Supervising Ranger at Torrey Pines State Reserve for another year!

\*\*\*\*\*

On Sept. 15, Ranger Randy Hawley was transferred to Silver Strand and Border Field in Imperial Beach. Ranger Greg Hackett will move to San Elijo by Nov 1, when Rangers Steve Wood and Yvette Devieu will join the staff at T.P.S.R. Good luck to Randy and Greg. We enjoyed your stay here.

\*\*\*\*\*

The new slide show developed by Ranger Greg Hackett for use in the Visitor Center has been completed. It captures the moods and feelings at T.P.S.R. through use of Greg's own photography and the thoughts of John Muir, Aldo Leopold, Walt Whitman and others.

\*\*\*\*\*



# News & Notes

## ATTENTION DOCENTS!

Effective Nov. 1 Ruth Hand will resume her job as Duty Coordinator. Warm thanks go to Glenn Dunham for serving in this capacity while Ruth was ill.

For those of us who have been concerned, Glenn assures us that he is still active in our Docent Society. He has been sharpening his skills and improving his background for nature walks by taking advantage of the Natural History Museum's Canyoneer training program.

Continue to phone Glenn to sign up for duty during October at 455-6414. Give Ruth a call after Nov. 1 at 459-9020. Let's keep every slot on the calendar filled!

\*\*\*\*\*

While Glenn is attending training sessions through the end of the year, Isabel Buechler will serve as refreshment chairman.

\*\*\*\*\*

Any 1983 T.P.S.R. training class member who would like to have some one-on-one training, please contact Judy Schulman at 452-7683 evenings to set up a time and day.

\*\*\*\*\*

## Secretary's Notes by Julie Marine

The regular monthly meeting of the Torrey Pines Docent Society was held on September 17, 1983, at 9:00 A.M. in the Lodge. The meeting was attended by 28 docents and park staff. President Judy Schulman welcomed back several members who had been on extended vacation trips.

Judy requested all docents to sign the State Oath of Allegiance Forms and return them to her, or leave them in the docent mail box, as soon as possible.

Judy displayed an original menu from Torrey Pines Lodge when it was a restaurant in the 20's, which she obtained from Margaret Fleming. Dinners, one of which was a lobster entree, cost \$1.00.

Vice President Bill Brothers introduced the guest speaker, Tom Demere, Curator of Paleontology and Geology at the San Diego Natural History Museum. Tom presented an educational slide program on fossils of San Diego County. Examples of fossils, particularly shells of various marine creatures, are plentiful in the rocks and sandstone cliffs of Torrey Pines State Reserve, as well as Point Loma and other areas of the county. Numerous rare finds have been uncovered at construction sites.

Two copies of the booklet Golden Guide to Fossils were awarded by Judy as prizes. She also distributed copies of a Readers Digest reprint entitled "Garden Wars," which deals with the battle of plants for survival through production of chemical toxins.

Docents Marge and Bob Amann reported that the Sierra Club Lodge in the Cuyamacas is available to Torrey Pines docents for day or overnight use for a nominal fee. Visits should be scheduled in advance.

Bill Brothers requested that docents who are interested in a whale-watching trip should submit their names to him by November.

Refreshments were served following the meeting.

# Quiz

(Excerpts from Quiz on Ruth Hand's Alaskan cruise ship)

- 1- What 2 letters describe a snake's eyes?
- 2- What 2 letters mean an attractive docent?
- 3- What double letter contains a great deal of water?
- 4- What 3 letters are something of which a docent has a lot?
- 5- Discern a familiar word or phrase from the following:

a-

wheather

b-

O  
MD  
BA  
PhD

---

## STAR STORIES by Ranger Randy Hawley

I would like to take this opportunity to thank all of the Docents for their friendship and support during my stay here at Torrey Pines State Reserve. I have been transferred closer to my place of residence in Imperial Beach and will be working at Silver Strand and Borderfield State Beaches.

It has been a pleasure to work with you, and I will continue to coordinate the Restaurant Recreation with the Docent Society. The table is being refinished, curtains are being made, and we're still looking for chairs. All else is just about complete.

Some of you requested a short rundown of the star tales I shared with you at the August meeting. It's my favorite interpretive program and I'm glad you enjoyed it.

The Big Dipper is looked at in many cultures as a giant bear. This bear sometimes has a long tail, which got that way because it was stretched when it was thrown into the sky. Another story tells of a hunter carrying a pot (the double stars in the handle) with two dogs chasing the bear. They finally kill it in the fall of the year. The blood from the animal turns the trees red.

The North Star was called the "star that stands still; all other stars walk 'round it." It is the hole in the heavens, and the light is the radiance from the other side. It is the entry way for all goings between heaven and earth.

The Northern Crown is the lodge of the spider-man, the St. Peter of Indian lore. It has also been called a council of chiefs responsible for guarding the sacred lore of the sky.

The star Arcturus is the eye Coyote lost when he was showing off for the Indian maidens by juggling his eyeballs.

The star cluster Pleiades represents the seven dancing Indian boys lured into the sky by the song of the moon. One boy turned his attention back to his mother on earth and returned to her in a fiery streak. From the spot where he hit, a tree grew, the tallest and straightest tree in the forest.

The constellation Scorpio has two different tales. One tells how a scorpion was sent to torment the great hunter Orion, who had been abusing his position. Today, as the constellation Orion sets on the western horizon, Scorpio rears up in the east to continue his relentless pursuit. The Hawaiians tell how the god Maui snagged the bottom of the sea with a great fish hook (the scorpion's tail). He pulled and pulled until the bottom of the sea rose above the ocean's surface, creating the Hawaiian Islands.

The Milky Way, that band of stars running across the sky, was the pathway into the heavens for fallen warriors. It was also seen as the trail of flour spilled by a fleeing Coyote after stealing a bag.

Meteorites represent newborn babes, and all stars represent a life spirit.

The Indians were aware that the earth's resources were not limitless and anticipated an end to all life. The recent discovery that the star Vega has material orbiting it, the first proof of another solar system, gives us hope that life will continue, if not here, then somewhere.



The thing to remember is that fantasy stimulates ideas. Continued review of ideas leads to belief, and the confirmation of beliefs means truth. From creative fantasy to science is a short trip. By not using our creative muscles we are missing chances to grow and be stimulated by the natural world around us.

---

OLD BOOKNESS, NEW BOOKNESS

*by Hank Nicol*

We had a small fire near the highway. I had to write up a report which, naturally, ended up as the October "Notes from the Naturalist." I've been struggling on a paper about sharks for a couple of months. I think I'm finally getting somewhere with it. My ambitions to write something on quail and something on foxes are getting me nowhere. With all this, I'm not getting much inspiration to write for the Torreyana, so I thought I'd give you a rundown on the status of "The Book."

The first book, Notes From the Naturalist, is almost sold out. That isn't any world wonder, because we only had 500 copies printed, and we sold it only here. I think I must have autographed half of the books that were sold, but I'm still neither rich nor famous.

As I'm writing this, the manuscript of the second book is in the "Out" basket. By the time you read this, the wheels should be churning. The new book is about Torrey Pines, the place, but doesn't have much about torrey pines, the trees. That's why I've called it Torrey Pines, Beyond the Trees. It was a little easier to write than the first one because when I was writing my Notes... I kept thinking "Book!" A lot of it is a modified version of things I've written before. ...Beyond the Trees is getting official sanction and help in that Brenda Boswell of the publications section has been editing and proof-reading it, and it is being word processed (as a non-priority job) in Sacramento.

My biggest disappointment was when certain parties ganged up on me until I agreed to drop one chapter. That chapter was the one I had worked on the hardest and was proudest of. It's science fiction, and everyone but me thought it was way too far beyond the trees. I'm still working on it and adding to it. It contains some things I want to say. You're going to hear about it again.

---

Answers to Quiz: 1- B D, 2- Q T, 3- C C's, 4- N R G, 5- a) a bad spell of weather; b) 3 degrees below zero

# ANIMAL TALK

## Cottontail

From the moment they are born, it seems like someone or something is out to get the poor little cottontail rabbit. Predators are many. Owls, coyotes, hawks, weasels, foxes, bobcats, snakes and even domestic pets find this little rabbit fair game. Those that escape their predators, have to be on guard for hunters, trappers and probably the biggest killer of them all, the automobile. Yet, the cottontail survives.

Their ability to reproduce in such large numbers is the main reason that they are able to survive as a specie. Able to mate at 6 months of age, the female prepares for her new family by forming a shallow nest, well hidden beneath a clump of tall grass or in a dense thicket. Although her feet are strong enough to dig a burrow deep in the ground, she prefers to make her nest above ground. Her nest is called a form. After finding her spot, she scoops out a saucer shaped depression, and then, pulling hairs from her breast which she mixes with soft grasses, she forms a blanket. With this blanket she will cover her babies when she is away from them. The blanket not only keeps her young warm, but is so effective as camouflage that you could walk within inches of the nest and not see it.

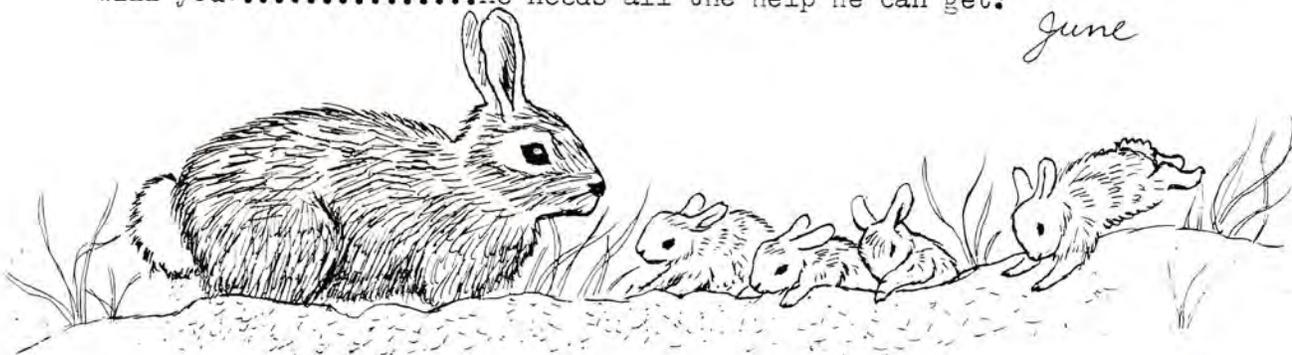
The baby cottontails are born hairless, blind and helpless. One hour after they are born, their mother leaves them for a short time to mate, so that when the babies are only a few hours old, their mother will already be pregnant with her next litter. She returns to care for her babies who will have their eyes open and be fully furred when they are one week old. By the time they are three weeks old, they are weaned and able to take care of themselves. One week after her young leave the nest, the mother will give birth again. Cottontails can breed from January through August, depending on their geographic location. May is the month of peak reproduction however, because it is ideal from the standpoint of temperature and food production. Cottontails normally have four or five broods in a year,, with an average of five or six in a litter. The mother spends most of the day about 25 feet away from her nest, just watching. If a predator should come near, the mother will try to lead him away from the nest. Even the father of her babies is chased away, since he will readily kill his offspring. Although we think of the rabbit as a gentle, easily frightened animal, there have been documented reports of mother rabbits even attacking human beings who have unknowingly strayed too close to a nest.

Although the cottontail is not a fast runner, they are often able to confuse their predators by their erratic zig-zag running patterns. Surrounding her nest is a series of well remembered paths. When chased by an enemy, the rabbit follows her paths which, unfortunately, often lead in a circle. A clever enemy like a coyote or fox soon figure this out.

The life story of the cottontail is not a pleasant one, but they are a most necessary and important link in the chain of life in the wilds.

But.....next time you hear the song, "Here comes Peter Cottontail, hoppin' down the bunny trail",.....say a little prayer for him will you?.....He needs all the help he can get!

*June*



Two issues ago I excerpted a local 1920's newspaper article that tried to explain the origins of the Torrey pine tree. What should I get in the mail sometime later but an Environment Southwest magazine (Summer 1983-Number 502) with an extremely interesting, but updated, article on the same topic. I would like to thank the staff of Environment Southwest (published by the San Diego Natural History Museum) for granting me permission to reprint their article.

## Beauty Caught

By Gary Serbeniuk, University of California, Santa Cruz

To San Diegans it is a familiar sight—the rare and twisted Torrey pine holding fast to the sandstone bluffs above Soledad Valley. For 300 miles along the coast, from San Vicente, Baja California, to the Santa Barbara Bay, there is no other stand of native pines. The Spanish navigators who plied these shores in broad-bowed caravels must have marvelled at such conifers, growing amongst black sage and coyote brush, cholla and prickly pear. They called this landmark grove "Punta de los Arboles"—Point of the Trees.

In January 1983, Drs. Thomas Ledig and Thompson Conkle, researchers from the United States Department of Agriculture Institute of Forest Genetics, published a paper in the journal *Evolution* that described a startling discovery about the genetic structure of Torrey pines. Their work has excited people like Dr. Robert Haller, a University of California at Santa Barbara botanist who has studied and written about Torreys for the last 16 years. However, interpretation of their discovery is controversial. Haller offers an explanation that differs from that presented by Ledig and Conkle. Dr. William Critchfield, author of the *Geographia Distribution of Pines of the World*, and a botanist in the same Forest Service office as these two researchers, is also skeptical of their conclusions. The Torrey pine gives up neither seed nor secrets easily.

Torreys were first described as a species by botanist C.C. Parry, during the Mexican-American Boundary Survey of 1850. He named the tree after John Torrey, an early taxonomist of American flora and the man who got Parry his job with Survey. Parry found a few thousand of the trees growing along the cliffs from Del Mar to La Jolla.

These life-sized bonsai lean back from the sea cliffs, their tap roots drilled as much as 20 feet into the sandstone. Surface roots scramble up to 200 feet from the trunk in search of water. Their grey-green crowns are sparse, with resilient twigs and the strongest needles of any pine. They are built for the blustery coast, yet seem to be trapped on the Del Mar site. Parry believed them to be the "struggling remnant of a past age."

Dr. Parry returned to San Diego in 1883 and addressed the Society of Natural History. He was concerned that the rare Torreys were being cut for firewood and fence posts, and dug up for use as ornamentals. He enjoined the Society to "secure from threatened extermination this remarkable and unique Pacific Coast production, so singularly confined." But there was more to Torrey pines than Parry had discerned.

Five years later, while doing a survey of the flora of Santa Rosa Island (near Santa Barbara), T.S. Brandegee discovered a small grove of Torreys. The grove runs for a half mile along the northeast shore of the island, facing Santa Barbara. Still rare and endangered, the Torrey pine was not as singularly confined as Parry had supposed, yet it was harder to explain. How could this "remnant" hole up on a thousand acres of sandstone in north San Diego (with an ocean on its west side, a lagoon to the southeast, and dry chaparral lands to the east and south) and on 300 acres of island, 175 miles away from Del Mar, 28 miles from the nearest mainland? How do such small populations keep from in-breeding excessively and producing such genetically similar organisms that there are no individuals capable of surviving a change in environmental conditions?

Ledig and Conkle came here to collect Torrey pine seed to learn how a small

population, such as the Torrey pine, with only 7,000 members at the San Diego site and 2,000 more at Santa Rosa Island, maintains genetic variability. Lining up the population perpendicular to the direction of pollen dispersal seemed a possible method. Pollen from windward trees would blow easily to trees directly east of them, but would not be carried as easily north or south along the grove. Ledig and Conkle thought they might find a string of tree groups, like a necklace of beads, laid out along the coast, that represented family structures several generations old. Each group would differ somewhat from its neighbors and even more so from more distant groups.

Every February male cones turn yellow with pollen over the lower third of a Torrey pine. The slightest breeze will scatter pollen to the female flowers in the tips of nearby trees. Spring winds coming off the Pacific hit the coast of Southern California at a right angle and, consequently, the Torreys which are lined up parallel to the coast for five miles at the San Diego site, according to Dr. Conkle.

Geneticists like Ledig and Conkle study heredity and the structures in cells that affect it. They would like to look directly at the genes responsible for specific hereditary traits but there is no method for doing so. However, there is a way to look at enzymes—a direct product of genes. It is these enzymes that initiate the chemical reactions that are the basic work of every cell; that make one cell different from the next; and that ultimately make one organism different from another.



(Photo by Len Hertler)

Using a technique called electrophoresis, Ledig and Conkle were able to separate the enzymes produced at the same 59 gene locations (loci) on the chromosomes of 106 San Diego Torreys and 51 Santa Rosa Island Torreys. Each enzyme can occur in several forms called alleles. The forms vary in their molecular structure and electrical charge. Electrophoresis takes advantage of this by creating an electrical field around the sample. Because the enzymes all have some degree of negative charge they begin to move toward the positive pole of the system. The more highly charged types move faster than the other types and, thus, the forms are separated. The two experimenters expected to find similar enzyme forms, indicating similar gene types, within groups of trees along a grove. What they did find startled them.

All 106 trees in the San Diego sample were genetic look-a-likes. For each of the 59 enzyme systems tested, Ledig and Conkle found 106 identical enzyme forms. The Santa Rosa population showed the same uniformity. It did differ from the San Diego population in two of the 59 forms. This discovery is especially surprising because pines are believed to be among the most genetically variable organisms in the world.

Ledig and Conkle link this discovery of zero genetic diversity within populations and a small genetic diversity between populations, with the old mystery of how the two small, separate populations came about. They suggest that Torrey pines once ranged from San Diego to Santa Barbara. At some point, at least 180,000 years ago according to one calculation, a Torrey seed got from the mainland out to the Channel Islands. Santa Rosa Island itself is 25 miles from the mainland today but the group as a whole was about four miles from the coast back then. A cone could have rafted across to the islands on a fallen log or a seed could have been carried across by a bird. The seed is heavy and its seed wings small so it probably was not blown over there.

Citing the direction of longshore currents, Ledig and Conkle reject the possibility that a cone rafted from San Diego to Santa Rosa Island. Nor do they give much credence to a cone rafting from Santa Rosa to San Diego. Finally, they reject the notion that Torrey pines got out to the Channel Islands when the group lay off the coast of San Diego some 20 million years ago. The genetic differences between the two populations are too slight for them to have been separated so long.

If a cone did get out to the islands, it's not difficult to imagine a loss of genetic variability. All individuals of the insular population would share a close, common ancestor. Yet, there might still be diversity. Geneticists talk in terms of probability. It helps to think of the possible combinations of gene types as the outcome of the flips of two coins.

When you flip two coins there is usually a 25% chance that they will both come up heads, a 50% chance that they will come up heads and tails, and a 25% chance that they will both come up tails. If one of the coins is two-headed, the odds are shifted in favor of heads. There is a 50% chance that they will come up heads, a 50% chance that they will come up heads and tails, and no chance that they will both come up tails. If only the two-headed coin makes it out to the island, the odds are simpler to calculate.

Plant genetics are far more complex than coin flips but they are subject to the same sort of shift in the odds. If a single Torrey cone got out to the islands, it could easily produce a genetic drift away from the mainland population and toward uniformity.

Ledig and Conkle further suggest that the mainland population from Santa Barbara to Del Mar died out during a hot, dry period that lasted from 8,500 to 3,500 years ago, leaving a San Diego population of less than 50 individuals, subject to gene drift and loss of genetic variability. Since that time both populations have built up to their present numbers.

There are some problems with this description of Torrey pine history. The San Diego and Santa Rosa populations are extremely similar. There are an astounding number of possible combinations of 59 enzyme systems, even if each gene locus produced only two forms of an enzyme—which it doesn't. It seems unlikely that the two populations would have drifted in a nearly identical manner. Of course, they may have had little or no genetic variability before they separated. The red pine, whose population ranges across northern Canada in numbers large enough to be of commercial interest, shows no genetic variability. This could be explained as evidence of some former reduction in the population. Evidently the type of red pine that made it through that population bottleneck has been very successful under current environmental conditions. Just such an earlier bottleneck seems necessary if the above Torrey pine history is to be accepted.

Dr. Critchfield questions the probability that the two rare events employed in Ledig and Conkle's thesis—a seed from the mainland getting established on the island, and the mainland population being reduced so drastically—would both occur.

In 1967 Dr. Haller wrote a paper describing the Santa Rosa and San Diego populations as similar but having significant differences. In accordance with Ledig

and Conkle's work, Haller has just completed a new paper that interprets the two populations as sub-species. (Dr. Haller is calling the Santa Rosa population *Pinus torreyana insularis*.) Yet, he does not agree with their analysis of the development of Torrey pines. Haller uses the more traditional tool of morphology—the study of an organism's structure—to determine its relationship to other organisms and thereby its evolutionary history. He sees the Torreys as closely related to two Mexican pines with no common names: *P. pseudostrobus* and *P. oaxacana*. That relationship is important.

From fossil evidence, botanists know that the Sierra Madre Occidental Mountains of northwest Mexico were an important center of speciation for much of the Southern California flora during a period that lasted from 30 to 12 million years ago (mid-Tertiary). Prior to that, Southern California was occupied by a group of broad-leaved evergreens called the Neotropical Tertiary Geoflora: figs, avocado, cinnamon, palms and the like. The species that developed in the Sierra Madres, the Madro-Tertiary Geoflora, had smaller, harder leaves. They were better adapted to the drier times and frequent fires that came to California during that period. Among them were pines. Haller believes that Torrey pines developed in Southern California from Mexican stock and got out to the Channel Islands as early as 25 million years ago.

The Southern California mainland has become even drier since the Tertiary period—summer rainfall is rare. But conditions on the offshore islands are similar to what they were 25 million years ago. Surrounded by water, they have fog when they don't have rain. Haller thinks that Torrey pines have occupied the Channel Islands for many millions of years. He believes they were eliminated from the mainland during some hot and dry interglacial period. Then, somewhere between 130,000 and 180,000 years ago (another estimate of the time it would take the Torrey populations to vary at two gene loci), a seed left the islands and recolonized the mainland. It may have developed a large population that later shrank to its present San Diego size.

Today the sandstone bluffs above Soledad Valley are covered with small, hard-leaved plants such as black sage and coyote brush that developed in Mexico during the Tertiary; Sonoran Desert plants like cholla and prickly pear that came later as the area got even drier; and the Torrey pines.

There is no reliable fossil evidence of the Torrey pine. Ledig and Conkle, Haller and Parry have tried to re-tell its history using genetics, climatic associations and morphology.

Conkle noted that it is crucial for a species to retain several forms of its alleles (gene types) in order to "succeed in a variable environment." Parry asked the city of San Diego and the Natural History Society to "secure (the Torrey pine) from threatened extinction . . ." Conkle is surprised that we ever saw it at all. "Give it another 10,000 years and some minor fluctuation in the environment and it won't have any way to cope." The beautiful trees on the edge of the cliff have nowhere to go. They can't change but environmental conditions surely will. ♡

---

“ . . . interpretation  
of their discovery is  
controversial . . .

There is no  
reliable fossil  
evidence of the  
Torrey pine. . . .”

---

**TORREY PINES DOCENT SOCIETY**

**PRESIDENT- Judy Schulman**

Deadline for Torreyana copy  
the 25th of each month.

Send contributions to:  
**Millicent Horger, EDITOR**

13130 Carousel Lane

Del Mar, CA. 92014

Phone: 481-9554

ASSOC. ED.- Isabel Buechler

OCTOBER with a lavish hand,  
 now spills  
 Her wine of gold and flame upon  
 the hills;  
 It splashes on the slopes and  
 blends into  
 Rich colorings of almost every  
 hue;  
 Deep red and russet orange,  
 yellow, jade,  
 Grape-blue and green and brown  
 of every shade.  
 And in the valley, hangs like filmy  
 mist  
 A veil of opal, blue and amethyst.  
 Rose-grey and violet - until it  
 seems  
 The earth is drowsy with the wine  
 of dreams.

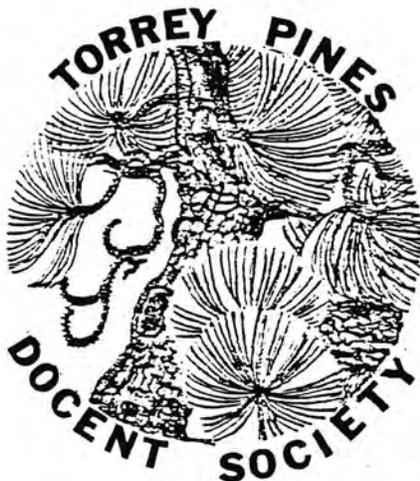
- James Courtney Challis

# JUDY ON DUTY



Of course I don't mind leading the walk,....  
...why do you ask??

Torrey Pines Docent Society  
 C/o Torrey Pines State Reserve  
 2680 Carlsbad Blvd.  
 Carlsbad, Ca. 92008



FOR

*File Copy  
 Please do not remove  
 from Docent Library*



Scrub Jay