

The EXPLORER

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Autumn 2002

*Newsletter of
Cabrillo National Monument
and the Cabrillo Monument Foundation*

Researchers roaming the park

*by Andrea Compton,
Chief, Natural Resource Science Division*

On my first day at Cabrillo National Monument as the new Chief of the Natural Resource Science Division, one of my many questions was an obvious one but

a critical one: "What is known about the natural resources of the park and what is their status?" One of the objectives of this division is to provide recommendations for the long-term management of those resources in keeping with the purpose of the National Park Service, "to conserve the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." In order to strive toward this goal, we have to know the current conditions of the plants and animals in both terrestrial and marine habitats and track

changes as they occur.

As a long-term volunteer, I was aware of, and involved with, some of the projects designed to gain this knowledge—specifically the inventory

and monitoring surveys, and I knew that some of these had been occurring for over ten years. More recently, I learned more of the extent of this research and that many projects are well underway gathering data for numerous natural resources in the park. The prior chief, Samantha Weber, and the interim chief and current marine ecologist for the park, Bonnie Becker, and their predecessors

established and implemented several

projects. In addition, we are currently planning additional studies. I want to share with you a quick summary of



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Journal of the
Cabrillo National Monument
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The articles for this issue of *The Explorer* have been collected and edited by CNM's new Chief of Natural Resource Science, Andrea Compton. They are intended to provide insight into the wide diversity and the importance of the natural resources of this relatively

small park and how we are caring for them.

In addition to Natural Resource Science rangers, contributors to this issue represent all divisions of the park staff: Administration, Interpretation, Maintenance, Visitor Protection and Resource Management, Cabrillo National Monument Foundation, and Volunteers-in-Parks.

It is a real pleasure to work with Andrea, and I am sure she will keep our readers up to date on the many activities of her division.

After 15 years of service as an interpretive ranger at Cabrillo, former *Explorer* editor Emily Troxell has resigned from the NPS. During her tenure, Emily made many important and long-lasting contributions to the park's educational and interpretive programs. We will certainly miss her.

Our new editor will be Patricia Heusner who has returned to Cabrillo after spending the summer as a seasonal ranger at Mt. Rainier National Park. Patricia has a wide experience in interpretation and education and is approaching the editorship with great enthusiasm. We are looking forward to working with her.

Jim Nauman



Andrea Compton

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those projects and some general ideas of where we are headed in the future.

Cabrillo National Monument is one of three National Park Service areas in the Mediterranean Coast Network. The other two are Channel Islands National Park and Santa Monica Mountains National Recreation Area. This network is, as a whole, coordinating inventory and monitoring efforts to consistently gain information about this Mediterranean-type ecosystem in order to make management decisions, conduct scientific research, and educate the public. A workshop, specifically for Cabrillo National Monument, was conducted in 2000 with regional land managers, researchers, Park Service employees, university personnel, resource experts, and the public to focus on which natural resources could be key indicators for the health of this ecosystem. Many of our inventory and monitoring projects occur with cooperation from the U.S. Geological Survey, consultants with specialties in particular fields, network members, community members, and volunteers. Previous studies and species documentations that have occurred are invaluable sources and bases of information on which current studies build.

The word "inventory" refers to the first part of learning what is in an area—conducting broad-scale surveys or sampling to determine what is present. If you have no idea what fish you have in the intertidal zone, you conduct an inventory to develop a species list.

Inventory projects in the past year that will be continued:

- bats
- birds
- terrestrial invertebrates
- larger mammals – carnivores
- small mammals

Inventory projects for the future:

- fish in the intertidal and shallow subtidal zones
- medium-sized mam-

mals (squirrels and rabbits)

- plants: exotic, rare, sensitive, threatened, endangered
- breeding raptors

The word "monitoring" refers to the long-term measurements of the organism or community of interest, and tracking changes in that group. Webster's dictionary defines monitor as "to watch or check on." Once you have established what is present through your inventory, a research program and specific detailed protocols are established to identify and implement consistent surveys on a regular basis.

Monitoring projects occurring now:

- rocky intertidal zone—started in 1990; occurs once each spring and each fall
- shorebirds in the intertidal zone – started in 1990; occurs each winter daily during minus tides
- herpetology (amphibians and reptiles)— started in 1995; occurs once a month
- air quality—started in 1996; occurs daily
- plants —started in 1998; occurs once per 3 to 5 years

Monitoring projects to be started:

- bats

As you can see, there is quite a collection of efforts occurring to gain knowledge about the natural resources of Cabrillo National Monument. Give me a call if you are interested in learning more about any of these species, or if you are interested in volunteering and helping. We'll be glad to share what we've learned far and we always welcome assistance!

2002: the summer of strandings

Bonnie Becker, Marine Biologist

Although the hows and whys are still uncertain, this summer San Diegans have had an opportunity to learn about marine animals that many had never seen before.

It started back in April. First, tens of thousands of little blue jellies started washing up on the beaches of San Diego County. As the jellies covered the beaches during low tides, kids would poke at them and parents would scold them. This was a major event for these local young beachcombers, but few others took notice. Less than two weeks later, a new player would bring local media attention to our local beach wrack, when thousands of what looked like tiny lobsters started washing ashore. During April and May, many southern California beaches were littered with little jellies, mini-lobsters, or both. Beginning in late July, national news media picked up the story, once thousands of very large squid started to blanket our coasts.

By the time the squid beachings slowed down in late August, our shores had been the gravesite of millions of blue jellies (actually a hydrozoan called the "by-the-wind sailor"), small red "lobsters" (actually pelagic red crabs), and whitish squid (Humboldt or jumbo squid). Although beachcombers of all ages went back to their normal routine of looking for shells and enjoying the surf, most San Diegans were concerned. What caused these mass strandings? Is there some hidden pathogen in our water? Are these the signs of some sort of marine Armageddon? Or worse, El Niño?

To get to the bottom of this mystery, we need to first consider the natural history of these three very different invertebrates.

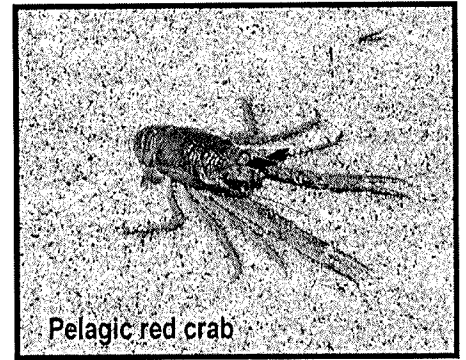
"By-the-wind sailor" (*Verella verella*)

These small (usually less than 6 cm), blue, floating, gelatinous creatures are actually not true jellies (sometimes erroneously referred to as "jellyfish," despite not being fish), but a close relative to jellies called a "hydrozoan." The main parts of the animal consist of a float, feeding tentacles, and most interestingly, a cel-



lophane-like, triangular "sail." *Verella* spends its day floating at the surface, being transported by the wind in its sail, and eating fish eggs and small zooplankton with its tentacles. Although the stinging cells on their tentacles are poisonous to their prey, they are relatively harmless to humans. However, it is not recommended to rub your face or your eyes after touching them.

What makes the design of *Verella* so clever is the angle of the sail. It is oriented with a "right-handed" slant, so that it is permanently set to take advantage of prevailing northerly winds on our coasts to keep them off shore. They are designed to rotate with the wind in order for their sails to remain oriented correctly. What happens on the other side of the Pa-



cific, where the prevailing winds are southerly? Japanese *Verella* (the same species) have the mirror-image "left-handed" orientation, with the same offshore effect. The same is true of their South American kin.

This clever design has a fatal flaw. Unlike a sailboat, where the sail can rotate, these critters are defenseless against changing winds. When the strong winds blow from the north or the west for a long period of time, as often happens during the spring, huge numbers of *Verella* can wash onshore. These mass strandings are not uncommon, but do not happen every year. This species is cosmopolitan (found worldwide), and massive numbers of them have been known to wash up on the beach in many other locations, such as Australia and the UK.

Pelagic Red Crabs (*Pleuroncodes planipe*)

Despite their appearance as "mini-lobsters", these organisms are more closely related to hermit crabs than lobsters or crayfish. They have had a variety of common names, including "red crab," "pelagic red crab," and "tuna crab," since they are often eaten by large fish such as tuna. In Mexico, where they comprise an important fishery, they are referred to as "langostilla."

In fact, these red crabs usually live in large swarms off the coast of Baja California. During their life cycle, they have both a bottom-dwelling benthic phase and a free-floating pelagic phase. While living on the bottom, they tend to hide in crevices, but when they are in their pelagic phase, they can form large swarms. They

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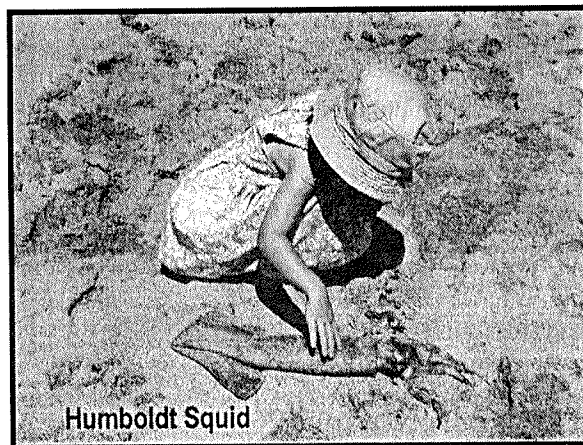
float in the water, using tiny hairs on their bodies to trap and eat plankton. They, in turn, are prey for many animals, including the aforementioned tuna, gray whales, and squid. Mass strandings of these crustaceans is an annual event in Mexico, and is not considered unusual there.

Since they are not strong enough to swim against most currents, they are powerless to resist the water motion and are swept along with the other plankton in the water. When anomalous ocean currents occur, such as during El Niño conditions, the red crabs can be carried further north as far as Oregon. This mass stranding spread at least as far as Malibu, Los Angeles, where movie stars were able to ponder their arrival much as we have. Although not a yearly event, the beaches of San Diego County have been covered by their red carcasses many times in the past.

Red crabs are quite small (generally less than 75mm), but they do have claws that can pinch human skin, which can be uncomfortable but is harmless.

Humboldt Squid (*Dosidicus gigas*)

These squid also have a number of common names, including "jumbo squid" (not to be confused with the famous "giant squid"), "flying squid" (since they are able to hurl themselves out of the water), "Humboldt squid" (named after the South American current, not the county in northern California), and "*calamar gigante*" (as they are known south of the border). They are excellent predators, with excellent maneuverability and, most frighteningly, sharp teeth in every sucker on their body. Although they are quite large (up to 3.5 meters long), they generally only live three to four years. In order to support such large growth rates, they must eat a lot of prey, which consists mostly of fish (such as grunion and anchovies), crustaceans (including the pelagic red crab), and mollusks (including other squids). At the end of their fast and short life, they spawn and then die. The individuals that washed ashore



in southern California were juveniles, and had not spawned yet.

These large and formidable beasts are native to the coasts of Peru and Chile, although they can be found as far north as Oregon. They are not unusual but not uncommon off our coasts, though the ones in our area tend to be much smaller than those in South America (averaging half a meter in length).

Since the first reported mass stranding in California in 1862, there have been ten strandings on the West Coast. This event, where tens of thousands of individuals washed ashore between the Mexican border and Santa Barbara, is considered the largest event in almost a century. In La



Jolla Cove alone, health officials removed over 14 tons of squid from the beach.

So, why did these three creatures wash up on our beaches?

Let's consider *Veleva* and red crabs first. A change in prevailing winds from northerly to southerly caused *Veleva*, whose sail is oriented to keep

it offshore during normal conditions, to be swept inshore. The red crabs, which usually swarmed off the coast of Baja and beach themselves in large numbers, were swept to the north by a current from the south. These two animals have historically beached themselves in the same years, and have been associated with the onset of an El Niño. When they appeared this year, there was a lot of buzz that this was a sign that El Niño was indeed on its way.

Is there any other evidence that we will see the dreaded El Niño? Forecasting El Niño is not an exact science, but according to the National Oceanographic and Atmospheric Administration (NOAA), the federal agency charged with predicting the climatic anomaly, El Niño conditions are developing. It will be significantly milder than the event in 1997-98, although our area is predicted to experience a wetter than normal winter. Perhaps they should change the expression to "April *Veleva* means buy an umbrella."

Unlike the jellies and the crabs, which are planktonic and unable to resist currents and winds, Humboldt squid are excellent swimmers. So the question about strandings can be split in two: 1. Why are Humboldt squid this far north?, and 2. Why did they end up dead on the beach?

One theory of why the squid migrated north was that they were following warm currents from El Niño. According to Eric Hochberg of the Santa Barbara Natural History Museum, the squid have historically migrated north during cooler years, not during warm, El Niño conditions. Another theory is that the squid were chasing the red crabs, which is one of their common prey items. The reason for their appearance is not entirely known, although scientists have noted that they have come in large numbers and have remained here for the past few months.

The large beaching events are also not entirely understood, although a number of causes have been ruled out. As mentioned above,



Bonnie Becker

There are countless opportunities to see and experience new things on our shoreline, from everyday interactions between common animals to exotic and charismatic visitors from faraway lands.

the beached individuals were mostly juveniles, and likely did not die as a result of spawning activities. One potential cause was poisoning by demoic acid, a neurotoxin produced by phytoplankton that has been linked to recent marine mammal deaths. Dr. Hochberg has sent some samples to a lab for chemical analysis. However, this cause is unlikely, since there have been no cases of demoic acid poisoning noted in the birds that were feeding on the squid. Another unlikely cause is starvation,

since samples collected had full stomachs at the time of death.

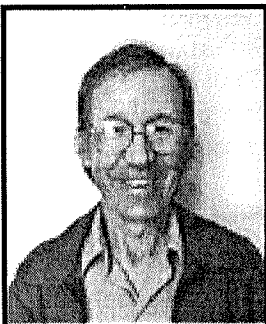
One common theory for the strandings is that the squid came close into shore to chase grunion, which were running at the time of the mass beaching. Once close to shore, the squid got trapped in the surf zone and stranded on shore. A similar hypothesis involves squid predators, such as dolphins, that were seen foraging nearby the day before the largest beaching event. Perhaps the squid were chased into shore where they

were trapped in the crashing waves.

Although the hows and whys are still uncertain, this summer San Diegans have had an opportunity to learn about marine animals that many had never seen before. These events captured the imagination of local beachcombers and naturalists. I sent a single e-mail to the Scripps Institution of Oceanography community seeking additional information, and I received dozens of responses from scientists, technicians, and divers who wanted to share their memories of past strandings, and their theories of what caused them. There are countless opportunities to see and experience new things on our shoreline, from everyday interactions between common animals to exotic and charismatic visitors from faraway lands.

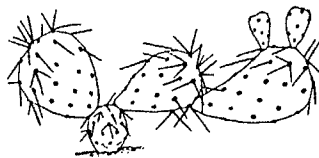
References available on request

All images are courtesy of John Moore, www.divebums.com



Life goes on: plant impressions

by Joe Wilson



Prickly pear are impressive and effective. In this time of drought, they and other cactus are stars of defense. The natural resources at Cabrillo need protection. As the park land is returned to native vegetation, these cacti silently call for help from the feet of the park's many visitors. Prickly pear, in stands, clusters and lines, helps point feet in the preferred direction. I see visitors stop and take the road. It's longer. It's less painful. It provides more quality park

time. I'm impressed.

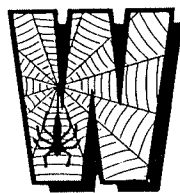
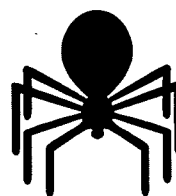
Our native plants are here to impress the visitor, to help encourage learning and to preserve the park's water. They help clean the air and improve the viewshed. Plants, large and small, bright (in color) and dull, are home to birds, mammals, and reptiles. The plants provide work for interpretation rangers, resource scientists, protection rangers and maintenance workers assigned to the park.

The camera: Think about the cam-

era and plants. Impressions pass as images to the mind through the eye. The camera makes collection without destruction possible. I like that. I'm impressed! Cameras and the natural resource go together. The cactus does defend what the camera sees. It is the responsibility of the staff to provide opportunities for visitors to enjoy the resource and learn about the resources. When visitors take pictures of natural resources they are impressed. The photos tell the story. Life Goes On!

Don't Smash That Bug!!!!

By: Tiffany Luas



With Halloween in the air and the sun now setting a little too early, more of our "creepy, crawling bugs" are roaming the dirt kingdom of Cabrillo National Monument. While crickets and spiders are not everyone's favorites, they are very interesting creatures and are incredibly beneficial to all the plants and animals living in Ca-

brillo, including us humans! The Jerusalem cricket and black widow spider are current residents of Ca-brillo, and they are both worth a closer look. As humans, we are inclined to smash anything we see that is 20 times smaller and creepier looking than us; didn't your mother teach you that it's rude to judge others on looks alone?

Both the Jerusalem cricket *Stenopelmatus fuscus* and the black widow spider *Latrodectus hesperus* are tasty treats for the many animals roaming Pt. Loma. Alligator lizards, birds, wasps, and praying mantises all enjoy a black widow meal. Jerusalem crickets are a favorite of most everything! In fact, they are considered one of the most important insects in California because they are the base of the food chain in most ecosystems. Ask any bat, skunk, fox, coyote, raptor, small hawk, or owl and they'll agree that they are a staple of their diet.

Black widows are common in the southern part of North America, while the Jerusalem cricket is found west of the Rocky Mountains and from Canada all the way down to Panama. Jerusalem crickets are most abundant in California. The black widow

and the Jerusalem cricket have a few other things in common: each is nocturnal—hunting at night and hiding during the day; each is scary-looking; and the females of both may eat the males after mating.

The black widow can be found weaving its web during the evening hours. The webs are often found in dark, undisturbed areas, including woodpiles, garages, fencerows, debris

(old tin cans are a favorite) and abandoned animal burrows. The spiders themselves can sometimes be found in sandy soils or beneath leaf litter, but more commonly they hang upside down on their sticky webs waiting for the

next victim to entangle itself. Typical feasts for this spider are crickets, beetles, earwigs, other spiders, and cockroaches. Jerusalem crickets tromp above ground during the evening hours (most often in winter when it's cold and moist) in search of a mate or food. But they usually stays in their burrow, which is located under rocks and logs and dug into soft sandy soil. While residing underground it eats both plants and animals (often dead plants and animals) making them omnivores and scavengers. Some things it chews on are roots, tubers, vegetables, fruits, dead insects, and spiders.

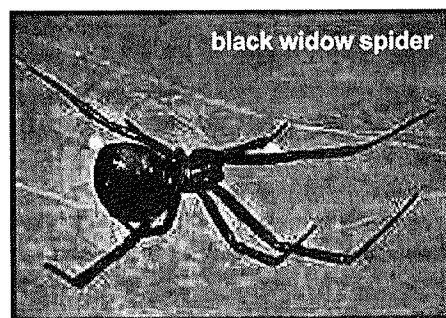
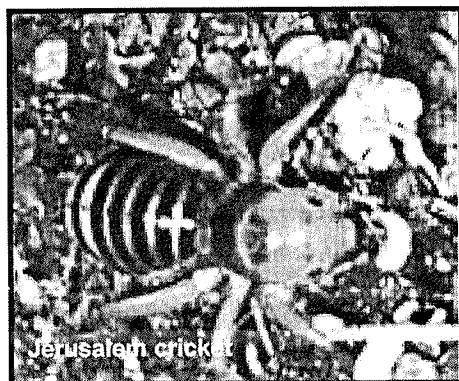
Black widows and Jerusalem crickets look really creepy, but in reality they help to keep other creepy bug populations moderate. The typical first reaction to either a black

widow or a Jerusalem cricket is "Aghhhh! What's that!!!!?" The key characteristic of a female black widow is the two red triangle markings (commonly connected to form the hourglass shape) on the underside of the large shiny black abdomen. The male has a color pattern consisting of a central row of red spots with white lines or bars radiating out to the side on its upper abdomen; the juveniles have a striped white and orange abdomen. The triangular markings can be white or red on both the males and juveniles. The Jerusalem cricket can immediately be identified simply by its size. One of the largest insects found in California and western North America, it averages 1 to 2.5 inches in length, but some species can reach 3 inches. "Size is not the only thing creepy about this bug; it also has large jaws and very round "humanoid" head. Both male and female abdomens are brown with yellow stripes; the females are distinguished from the males by their smaller head and larger abdomen.

The females of both these species eat the males after mating. This is true

for many insects. The black widow will eat her mate if he tries to come near her egg sacs. While mating, she will store his sperm to ensure she can produce more egg sacs without having to

mate again. The egg sacs can hold 25-900 eggs, which will hatch after approximately 20 days. Within one to two years the juveniles mature. Adult females are not the only cannibalistic ones in the family. When spiderlings hatch they often eat each other as their first source of food. Only one in 12 will survive to adulthood. With all this cannibalism going



on in the black widow family you can see that they probably don't have a long lifespan. The average life span of females is 1 year, and they will live no longer than 3 years. Males are lucky to live more than 5 months because they are often eaten after mating. Speaking of cannibalism, the female Jerusalem cricket also eats the male after mating, but not much is known about why this occurs. Females, having a larger abdomen than the males, are equipped to consume their mate. Scientists are still learning about these crickets; what they do know is that they complete a generation within a year: eggs hatch in the spring and by fall the little ones are all grown up.

Both of these invertebrates have really fascinating lives. Even though many people consider them repulsive, they help keep our lives free of even more scary bugs. If the Jerusalem cricket is unprovoked, it will do no harm to us gigantic humans. It is not venomous and will usually run and hide if harassed. If threatened as a point of defense it will bite, which may hurt, but if I were 20 times smaller than you and you kept poking at me I'd be sure to bite you too! The black widow is another story; only the female is venomous, using her fangs to inject neurotoxic venom into her victims. This venom is 15 times more toxic than the same amount of rattlesnake venom. This is a good reason to stay away, but in reality black widows rarely bite. As a result, there is approximately one death every five years due to their bites. They will bite when protecting their egg sacs but more often they run away. When they do bite they often inject only a small amount of venom, which adds to the number of survivor victims.

So the next time you see something small crawling around on the ground and grab this article to swat at it, open it up instead and learn about how great these creatures are. Or I can come over and warn you to look on someone your own size!

References available on request



Cabrillo People

by Chris Anderson



In this episode of *The Explorer*, we find Cabrillo National Monument recovering from the Cabrillo Festival and closing of fiscal year '02. While these events are a constant for the park, the staffing is always in flux. This time around we welcome to the park **Andrea Compton** and **Justin Moore** and say aloha (both hello and goodbye) to **Peggy Pratt**.

Andrea is the park's new Chief of Natural Resource Science. She was born in Seattle, but has lived in Texas, Virginia, Colorado, Iowa, Oregon, and the Philippines. Andrea and her husband Bobby have called San Diego home for the past seven years. She came to us from San Diego State University, where she was an academic programs coordinator. There she coordinated education and research for four field stations in both San Diego and Riverside counties. Before that, Andrea lived in Portland, Oregon, where she worked for an environmental consulting firm, specializing in permitting and regulations with threatened and endangered species. Since living in San Diego, Andrea has been actively working with volunteer projects throughout the county, including volunteering at Cabrillo. She has also spent a lot of time working with San Diego Park and Recreation's native plant restoration project. On top of all this, Andrea has taught general biology courses at Mesa College. She attended graduate school at Colorado State University, where she studied wildlife biology. For undergraduate studies, she attended Iowa State University, where she studied ecology.

When not working, Andrea enjoys everything outdoors. She and her husband enjoy riding a tandem bicycle, birding, camping, gardening, and hiking. When hiking, Andrea and Bobby are accompanied by their dogs Molly and Sambre. She also enjoys

music and spending time with her family. Musically, Andrea loves not only listening, but playing the cello, piano, and English handbells.

Justin, CNMF's newest employee, is a true San Diego native, born and raised here. I interviewed Justin on sixth day of working at the park and thus far, he says he likes it. An admitted "people person" and "people watcher," he enjoys the interaction with staff, as well as with visitors from around the world. When not working, Justin divides his time between school and recreational hobbies. He is attending Mesa College and hopes to transfer from there to a university. When asked what he wants to be when he grows up, he replies he is not quite sure. His interests range from studying medicine and becoming a pediatrician to working for the National Security Administration (NSA). He also likes working with computers. Right now, he is exploring his options, which appear to be many and varied.

His recreational interests vary from the mild to the wild. Justin enjoys SCUBA diving, snorkeling, and sailing, as well as extreme sports like free falling and bungee jumping. Like his hobbies, Justin's food interests run the gamut. When nailing down his favorite cuisine, he says it is a toss up between Italian and Chinese.

We would like to say aloha to CNMF employee Peggy. Peggy has graciously agreed to stay on with the CNMF team through the end of November. Unfortunately, due to scheduling conflicts, I was unable to interview Peggy for this edition. I hope that I have the opportunity to do so before she leaves and include her in the next edition.

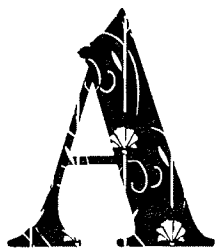
Well, that wraps it up for this edition of *Cabrillo's People*. Until next time, take care, stay safe and out of trouble.

Superintendent's report

by Terry DiMattio



Two projects that we have been working on for the past several years, and that will have a significant impact on the park for decades to come, have been approved.



After months of patiently—and sometimes impatiently—waiting, I have some wonderful news to share with you. Two projects that we have been working on for the past several years, and that will have a significant impact on the park for decades to come, have been approved. The first project is the one to rehabilitate the grounds around the Old Point Loma Lighthouse to more closely resemble their appearance in the 1880s. The second one is to relocate the entrance station. These projects are in the approved *General Management Plan and Environmental Impact Statement (GMP/EIS) for Cabrillo National Monument (1996)*, and will be paid for through the Recreation Fee Demonstration Program with money that we have collected at the entrance station.

I would like to tell you about the second project first. In August, the Navy approved our request to build the entrance station on its land north of the intersection of Cabrillo Memorial Drive and Cabrillo Road, slightly south of the entrance to Battery Ashburn South. We are relocating the entrance station for three reasons. The first is to provide an extra measure of protection for the tidepools on the west side of the monument. We believe that if visitors have to pass the entrance station and pay the fee before going to the tidepools, they will realize that this fascinating but fragile area is administered by the NPS and will want to help us protect and preserve it. The second reason is to address a long-standing safety concern. Motorists currently ap-

proach the entrance station at a speed of 35 m.p.h. or faster; some do not see the entrance station until they are within 400 feet of it. When they realize they must pay the entrance fee, many get a case of "monetary panic," steer into the entrance-sign pullout, turn around, and drive against one-way traffic, creating the possibility of a motor vehicle accident. The third reason for relocating the entrance station is to introduce equity into the recreation use fee program. We have been collecting an entrance fee here since 1987. For the past 15 years, people have been able to enjoy the west side of the monument without paying the fee, while the majority of visitors have paid to visit the lighthouse, hike the Bayside Trail, and see the exhibits on Cabrillo and Fort Rosecrans.

The new entrance station will have a "stacking" lane for those who will be paying the entrance fee, a by-pass lane for Navy and City of San Diego Wastewater Department employees and Coast Guard families who live at the "new" Point Loma Lighthouse, and an exit lane. There will be a turn-around lane behind, or south of the entrance station for those visitors who do not wish to pay the fee and enter the monument. There will also be a bicycle lane on the west side and one on the east side of the entrance station for those who bicycle, walk, or jog to the park.

We are working with our contracting office in Oakland to find a suitable contractor, negotiate an acceptable price and determine a date when construction will begin. We are hoping that construction can start this fall.

We are also working with the contracting office on the lighthouse

project. With luck, construction on this project might begin in late fall or early winter.

We have talked about this project in previous editions of *The Explorer*, but I would like to review with you what we will be doing to rehabilitate the grounds of the Old Point Loma Lighthouse:

- Remove most of the asphalt loop road and former parking area around the lighthouse, the asphalt walks, rock stairs, picket fence, and all the vegetation except for the Torrey pines. We will re-establish the historic ground contours to approximate those of the 1880s. The outer rock wall that defines the historic zone will remain in place. The interior rock wall that surrounds the lighthouse will remain in place, except for a portion at the south end, which cannot be covered with enough soil to allow native plants to grow.
- Relocate the National Register of Historic Places and California Registered Historic Landmark No. 51 bronze plaques to the site of the existing lighthouse wayside exhibits at the end of the walk leading from the visitor center. We will install a bench and bronze tactile models of the lighthouse and Point Loma and San Diego Bay.
- Build a 10-foot wide, tan-colored concrete promenade walk with red brick edge inside the outer rock wall, and a 12-foot wide asphalt road on the west side of the lighthouse. The road will lead to two accessible parking spaces that will be built south of the lighthouse, the Whale Overlook, and the Navy antennas.
- Build wheelchair-accessible walks of decomposed granite, or other suitable material, extending from the tan-

Our reclusive oppidan

by Carol Ann Vallee



colored promenade walk to the lighthouse.

- Outline the historic location of the barn and oil shed with sandstone blocks or rocks from the interior rock wall and fill the areas within the outline with decomposed granite or another suitable material. A concrete rain catchment basin will be built in front of the lighthouse similar to the one that existed in the 1880s. We will re-install the wooden flagpole and picket fence in their historic locations and plant native vegetation outside the picket fence.

- Build a 900-square foot exhibit shelter southeast of the lighthouse on the footprint of the assistant keepers quarters. The shelter will be similar in scale and appearance and incorporate materials similar to those found in the original quarters. The shape, roofline, windows, doors, and siding would replicate those of the assistant keeper's quarters. Inside will be exhibits on the lighthouse lens, the keepers and their families, and the history of the lighthouse itself.

- Build a universally accessible, single-commode, unisex restroom on the back of the assistant keepers quarters.

As we award the contracts and proceed with construction, we will keep you informed of our progress in future editions of *The Explorer*. We hope too that you will visit the park often this fall and winter to watch these projects become a reality. They are the exciting projects that will benefit the monument's natural and cultural resources and our visitors for generations to come.

The night is black, frigid, and wet. The moon struggles to illuminate the dark sky through thick cumulonimbus blankets. It is silent except for the occasional patter of water

droplets splashing against the damp ground. He wakes and opens his large bulbous eyes. Slowly, he begins to crawl up through the subterranean and eventually emerges onto decaying flora. He relishes the sight of shiny black beetles creeping along the earth and hundreds of vexing insects flying about the dank air. It does not take him long to find what he is looking for. With a quick flick of his sticky tongue, a furry brown spider disappears into his belly forever! He quickly focuses his eyes once more and without warning a chubby little cricket has now become his prey.

This creature that prefers the conditions we detest is not some terrible monster from a bad horror movie; it

storm. In addition, they are nocturnal and although they may be found walking around during dawn or dusk, they would rather be asleep deep underground in a cozy nook far out of harms way. They spend the dry season—most of their time here at Cañon National Monument—inactive below ground in communal burrows.

When you slip on your slicker and galoshes this winter in search of these peculiar creatures, look for a worm-like body that may vary in coloration from brown or grayish, to light tan and pink. They are commonly found on the ground but can climb up to two feet high on plants. They have four toes on each foot, which is unique to this genus, and are typically only a few inches in length. They have a small head with relatively large eyes and a long fleshy tail. They are really quite fragile and must be handled with extreme caution and wet hands as their tails are easily detached.

If you venture out during the first rain of the season, you may be lucky enough to find an adult female laying her eggs. She can lay between eight and twenty five relatively large (4mm) yellowish

eggs. The shells are gelatinous and enlarge as they soak up moisture. They usually hatch in January and February. Once hatched, they mature in 18-24 months and can live seven to ten years...as long as their parents do not eat them at birth!

So, keep your eyes peeled this winter for our reclusive resident. You might be one of the lucky few who gets to witness this uncommon oppidan.



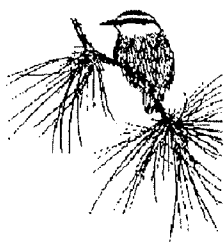
Keep your eyes peeled this winter for our reclusive resident. You might be one of the lucky few who gets to witness this uncommon oppidan.

Carol Ann Vallee

is, in fact, the Pacific slender salamander (*Batrachoseps pacificus major*). The scientific name comes from the Greek words *batrachos*, which means frog, and *seps*, meaning a kind of lizard. So basically, it is a frog-like lizard. Amazingly, it is the only amphibian found within the park boundaries and you sure won't find any of them hanging around very often! That's because they only come out after we have had a good, hard rain-

The new Point Loma bird list is here.

by Claude G. Edwards,
Volunteer, Cabrillo NM



As with any big and important project, finally completing it comes with a mixture of feelings ranging from satisfaction and relief to concern whether it

will be accepted and appreciated. There is also a sense of diminished mental and emotional momentum now that it is no longer the focus of attention. That is how I feel now that working on the latest version of the Point Loma bird list is finished, thanks in large part to our friend and former colleague, Emily Troxell.

The larger part of completing this project consisted of researching the list of birds observed in the Point Loma area and arranging them in correct scientific order according to the American Ornithologists Union, or A.O.U. Periodically, the arrangement and order of bird families and species in relation to one another is amended and updated following ongoing scientific research in the field as well as in the laboratory. In recent years the placement of certain bird families has been changed, such as New World Vultures (Cathartidae), Vireos (Vireonidae), Swallows (Hirundinidae), Gnatcatchers (Sylviidae), Kinglets (Regulidae), and Cardinal Grosbeaks and American Buntings (Cardinalidae).

Other less obvious changes have also taken place, such as changes in common names. A simple example is Long-tailed Duck (*Clangula hyemalis*) now used to replace the old name "Oldsquaw." Another example involves reviving old names of species that have been "re-split," as exemplified by changing Northern Oriole back to Baltimore Oriole (*Icterus galbula*) and Bullock's Oriole (*Icterus bullockii*). A more significant change

has to do with recognizing and naming newly determined and accepted bird species, such as Blue-headed Vireo (*Vireo solitarius*), Cassin's Vireo (*Vireo cassinii*), and Plumbeous Vireo (*Vireo plumbeus*) all arising from the former Solitary Vireo. Changes such as these are reflected in the new Point Loma bird list.

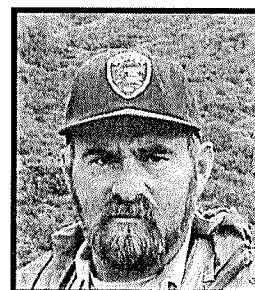
However, the most difficult part of this project was coming up with a fast but factual way to summarize and describe the "seasonal occurrence" and "relative abundance" of the birds observed on Point Loma. This information is the most interesting and valuable feature of the new bird list, something I have never attempted before. Two prominent individuals associated with the San Diego birding community, Philip Unitt and Richard Webster, were instrumental in providing me with essential information and comments. I am immensely grateful for their assistance.

In an attempt to standardize and streamline this information on the list, I wanted to come up with a system to explain the period of occurrence of each bird species and suggest how common they were. This was no small task! The seasonal component of the list was the easier portion to develop, but this inherently presumed that potential users of the bird list would understand my seasonal categories. The most difficult part was trying to explain the concept of "relative abundance" of each bird species. How was I going to do this? On one hand, I didn't have scientific survey results, nor did I review my personal birding notes, to directly compare and explain which species was more or less abundant than another. On the other hand, I was interested in somehow describing the potential for observers to find and enjoy birds on and around Point Loma. I managed to develop a basic two-letter system to accomplish this.

These will be explained in more detail in a follow-up article.

With help from Jim Nauman, the new bird list has already gone through its second stage, editing and formatting. It will soon be available at the visitor center at Cabrillo National Monument. I hope that it will be used and valued not only by casual visitors to Cabrillo, but also by the many energetic and focused individuals who frequent and visit the areas covered by the list in search of birds.

Illustrations by the author



We invite you to meet Claude and participate in his monthly bird walks at CNM. The walks are held on the third Saturday of every month at 9:30 AM, leaving from the visitor center. They are free with park admission.

For more information call
(619) 557-5240

Toyon: "trick or treat" among the flora of Cabrillo National Monument

by NPS Volunteer Pierce Harris



Toyon Bay, California, is one of the most beautiful and secluded places on the California coast. It is a very small harbor on Catalina Island and is the site of a summer camp for student youth groups to learn about nature. Toyon Bay also harbors a secret: it figuratively has skeletons in its closets that reveal a rather sinister past—antenna and radio equipment for spying. It was for many years an espionage school where the students learned that dark art. The lovely Christmas berry plant for which the bay was named—toyon, *Heteromeles arbutifolia*—also harbors secrets and likely some real skeletons. The secrets are in the seeds of toyon and many other members of the family Rosaceae. In the seeds are amygdalin and prunasin, cyanogenic glycosides that break down to release hydrocyanic acid. Hydrocyanic acid's older name was prussic acid—a very potent poison. It was what Lizzie Borden purchased at the pharmacy the week of her parents' demise (from other causes).

There is little danger of your being poisoned by toyon berries. The poison is released only when the seeds are crushed. Also the toyon is protected not only at Cabrillo National Monument but also by law throughout California. People are a greater threat to the toyon than it is to people. After Europeans settled in California, the berries were not only eaten but also gathered as Christmas decorations, giving rise to its other name, California holly, said to be the namesake of Hollywood.

Another member of the family Rosaceae reportedly found at Cabrillo is *Prunus ilicifolia*, wild cherry. Like



Pierce Harris

It is very important to note that even plants that are poisonous to humans may be useful and perhaps essential in the plant community as a whole.

toyon, the toxin in its seeds contains cyanogenic glycosides. There are 284 known species of plants in Cabrillo National Monument. Many are poisonous. What follows is a sampling of some of the more interesting.

Solanaceae, Nightshade Family

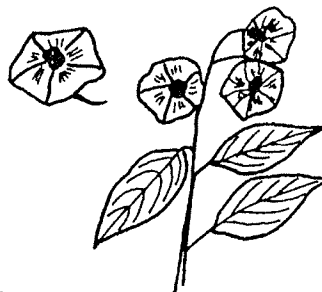
Gene Autry, the western movie star of the nineteen forties had a line in his theme song that went "...where the longhorn cattle feed on the lowly Jimson weed." I hope Gene's longhorns didn't eat very much *Datura*, also called trumpet flower or thorn apple. It not only poisons its neighbors' soil but it also has a package of toxins—namely tropane alkaloids, scopolamine, hyoscyamine, norhyoscyamine, meteloidine, and atropine—that are toxic to humans and livestock.

Nearly all members of the nightshade family are toxic or have toxic parts. Even the domestic tomato has poison leaves and stems. Other nightshade family plants reported found at Cabrillo are *Nicotiana glauca*, tree tobacco—an exotic; *Nicotiana clevelandi*, Cleveland's tobacco;

Solanum parishii, Parish's nightshade; *Solanum xanti*, chaparral nightshade; and *Lycium californicum*, California boxthorn. Dr. E.M. Schmutz in his book *Plants That Poison* states "...all species of nightshade should be considered poisonous. The glyco-alkyloid solanine is extremely toxic; even in small amounts can be deadly." In the

Nicotiana species the toxin nicotine can be absorbed through the skin. Also the alkaloid *anabasine* in tree tobacco is a deadly toxin. One of the more sinister aspects of wild tobacco plants is that bees collect nectar from the flowers and if enough wild tobacco

nectar finds it's way into the honey it can be poisonous.



Solanum xanti

Primulaceae, Primrose Family

An invasive exotic plant occasionally found at Cabrillo is the Scarlet Pimpernel, *Anagallis arvensis*. This lovely plant with reddish-orange flowers bears the nickname of a English folk hero of the French revolution who reportedly rescued people from the villainous Robespierre of "The Reign of Terror." If a few drops of an extract of *Anagallis arvensis* had been

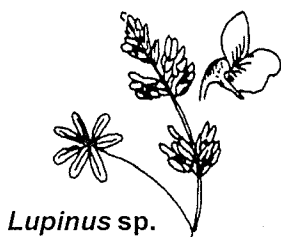
put in Robespierre's wine, France's Reign of Terror would have ended, for the entire plant is poison. One could say this plant is sufficiently poisonous to kill a horse, as two horses died after eating it in Monterey county. The toxins are a triterpenoid saponin and the glycoside cyclamin. Saponin is a toxin found in many useful plants like agave and yucca, they are natural detergents but are sometimes toxic, degrading hemoglobin.

Geraniaceae, Geranium Family

Some plants are toxic, or become more toxic, under certain conditions. An example is *Erodium cicutarium* (filaree, stork's bill, or needle plant). This plant has both native and naturalized species and although ordinarily not toxic there was a report of its producing hydrocyanic acid after a frost in sufficient quantity to kill livestock—an unlikely event at CNM. Children often play with this plant, splitting the needles to make miniature scissors.

Fabaceae, Pea Family

You have heard the expression "in the clover." Well, sometimes you wouldn't want to be—or at least would not want to eat it. This family, which includes many very useful plants and dietary staples of humans, also contains a great array of toxic plants. Generally these plants are nitrate accumulators and produce many alkaloids, which are both useful as medicine and often poison. We have at least eleven members of this family. Here are a couple of examples: The alkaloids of miniature lupine, *Lupinus bicolor*, and miniature lupine *L. truncatus*, can cause respiratory difficulty, convulsions, coma, and death. The seeds, fruits, stems, and leaves can all be toxic. The plant is most dangerous when young. The toxins can also cause deformities in the young of animals that eat it during the early stages of gestation. In livestock this is called "crooked calf disease." Problems have been reported in human mothers and in children who drank goat's milk where the goats had been foraging on lupine.



Lupinus sp.

Going back to being "in the clover," California burclover, *Medicago polymorpha*, has caused photosensitization in animals. White sweetclover, *Melilotus alba*, produces a toxin called Dicoumarol when in moldy hay. Dicoumarol is a derivative of glycoside. The effects are often lack of blood coagulation, which can result in death if the affected animal is injured. There is little risk to humans, though it has been used medicinally as an anticoagulant.

Astragalus (locoweed, crazy weed, rattleweed, milkvetch) is virtually all over Cabrillo National Monument. More than thirty species of this plant are listed in the book *Poisonous Plants of California*. The toxin in these plants is selenium. The plants are called selenium accumulators as they store large amounts of element. Selenium is an essential element in nutrition, however essential consumption is measured in micrograms and high levels are very toxic.

Brassicaceae, Mustard Family

We have nine representatives of Brassicaceae at Cabrillo; three are of particular appeal.

Black mustard, *Brassica niger*, and tansy mustard, *Brassica sophia*, are found in abundance in our park and throughout southern California. They are often considered nuisance plants. They are both useful as food and forage but sometimes toxic when in bloom. The toxin is not well understood. It can cause "paralyzed tongue" in foraging animals, resulting in the inability of the affected animal to eat. Mustards are also selenium accumulators and when growing in selenium-rich soil can become toxic. They also are a crop plant used in the production of prepared mustards for food condiments. The boiled leaves are also popular as food.

In the late 1980s considerable research was done with tansy and black



Brassica sophia

mustard for selenium control. Many of the soils of the Americas are so rich in selenium that their usefulness for agriculture is compromised. Experiments with mustard in reducing selenium in soils showed that a single crop of mustard could reduce the selenium by 25%. Details of this interesting study can be found in *California Agriculture*, Volume 43 Number 3, "Plants that remove selenium from soils," University of California (1989). It is important to note that many poisonous plants are quite probably also useful in ways we do not yet understand.

Radish, *Raphanus sativus*, is a plant that tends to accumulate free nitrates in sufficient quantity to pose a threat to foraging animals.

Many plants develop unique strategies for surviving and spreading. Poisons sometimes allow a plant to stake out or expand its territory.

Allelopathic Phytotoxins poison the offspring of competing plants by poisoning the soil! At Cabrillo, chamise, *Adenostoma fasciculatum*, and Jimson weed, *Datura meteloides*, provide this little surprise. Also some species of common ice plant *Mesembryanthemum* are known to concentrate salt in the soil to reduce competition by plants with low salt tolerance.

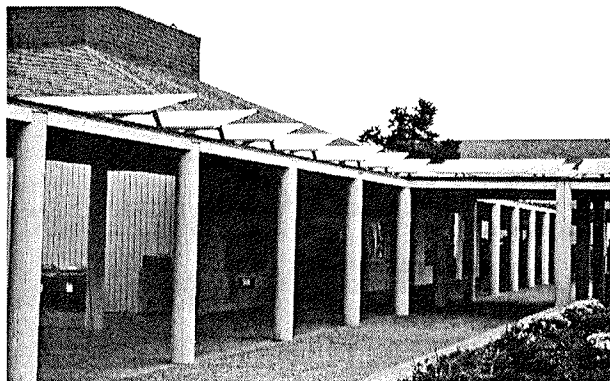
Skin irritants are another class of poisons that some animals, including humans, cannot tolerate. There are at least three of these at Cabrillo.

We have touched on only a few of the plants found in this park that can be classified as toxic. There are many more. It is important that plants may be poisonous in certain seasons and under certain temperature and soil conditions. It is also very important to note that even plants that are poisonous to humans may be useful and perhaps essential in the plant community as a whole.

Much credit is due to the many universities and their researchers who have published books on the subject of poison plants, but there is a class of unheralded people who are not only unheralded but also un-

known to us. These are the thousands of early Californians, the Paleolithic and Neolithic pioneers of botany who experimented with plants over many millennia. They left a priceless oral legacy of information to the Europeans who came after.

References will be furnished on request



solar panels on the roof
of the visitor center breezeway

cally to maintain temperatures.

- Outdoor sidewalk walkway lights were changed in 1999 from the standard lightbulbs to halogen compact fluorescent bulbs. The same was done for the overhead lighting in the breezeway.
- In 2001 the bulbs in the auditorium and the

exhibit room went from 100 watt to 60-watt bulbs. Energy-saving lighting was utilized in the design of the new Cabrillo Exhibit, which opened on June 27. Sustainable design techniques are also being incorporated into the design of the new lighthouse exhibits as well.

- View-building lighting was also changed to energy saving T-8 lighting.

In November 2001 an energy audit was conducted at Cabrillo, with a focus on the visitor center complex and further reducing waste throughout the park.

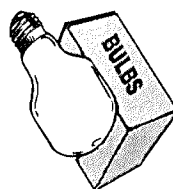
One of the most exciting developments in our ongoing efforts for energy efficiency has been the installation of the rooftop photovoltaic system at the visitor center. Visitors will now see solar panels on the roof of the breezeway, thanks to a generous grant from the Bonneville Power Administration. When the system is up and running the 96 panels on the photovoltaic system should help reduce power usage at Cabrillo from 150 to less than 100 kilowatts per day. Additionally, another photovoltaic system has been designed into the new museum collection storage building, which will be constructed in the near future.

As we move into the 21st century Cabrillo staff and volunteers will continue to look for ways to save on electricity usage. We hope to keep up with the latest developments in technology so that we can serve as a model for other organizations in our society's ongoing quest for energy self-sufficiency.



Conserving energy at Cabrillo

by Mark Mattivi



California's recent experience with energy deregulation and power outages has brought home for all of us the necessity of conserving energy both at home and at work. Sky-high electric bills and the possibility of blackouts have unfortunately become a part of life for us, at least for the time being. Nevertheless, here at Cabrillo the Environmental Committee, the Maintenance Division, and the other park divisions have been very proactive in implementing energy conservation measures to cut down on electric bills and do our part as we all work our way through this energy crisis.

The Environmental Committee has focused on four major areas to contribute to the "greening" of Cabrillo. These include water, energy, green purchasing, and recycling. With regard to energy, the park can boast several significant changes that have been made over the last few years to improve our energy efficiency and reduce utility bills. Here are some examples:

- The View Building, Administration Building, and the new Assistant Lightkeepers' Quarters are designed to make use of sheltering natural light and ventilation.
- Ongoing education of employees to turn off electronic equipment when not in use. This includes overhead lighting and hallway lighting.
- Installation of dimmer switches in the administration building.
- Installing energy-saving ballasts and lightbulbs. In the Administration Building some 70% of the standard fluorescent lamps were changed to energy saving T-8 fluorescent lamps. Ballasts were changed from standard to energy-saving. And the used ballasts were recycled.
- Motion-detecting lighting has been placed in the diaper-change room and the handicapped restroom at the visitor center. The Cabrillo National Monument Foundation also installed "vending misers" on the vending machines that automatically power down the machines when visitors are not present, but power up periodically.



Volunteers, meet your new Coordinator



Marcy's morsels

by Marcy Marquez

"I would like for us to continue to make this program as outstanding as you are individually and collectively."

Welcome, all, to *Marcy's Morsels*: the VIP corner for *The Explorer!* I am pleased to introduce myself, Marcy Cristina Marquez, as your new Volunteer Coordinator. I hope you are looking forward to the coming year. I am open to any suggestions/ comments/complaints. I am meeting with all of the monument's volunteer supervisors and would like to meet all of the volunteers that I have not yet met. I would like for us to continue to make this program as outstanding as you are individually and collectively.

A little about myself: I was born in Burbank, California, and moved to the Antelope Valley with my family at the age of 7. After graduating from Littlerock High School, in the city of Littlerock, California (no, not Arkansas!), I attended San Diego State University and became a Volunteer-In-Parks (VIP) for Cabrillo National Monument. I was accepted into the Student Career Experience Program (SCEP) and continued my involve-

ment with the monument. After graduating, I was converted to permanent status as a park ranger, and am delighted to work here as the new Cabrillo National Monument Volunteer Coordinator.

The VIP area in the library has been redecorated and a little home for the VIPs in the Natural Resource Science Division office will be added. Please, oh please, remember to sign in your hours after your hard work. We have new volunteer-hour recording sheets for fiscal year 2003 and I have also changed the forms a bit to incorporate different headings that will cover most of your activities.

For Lighthouse volunteers, I will be moving the keys from Carol Knipper's office to an area behind my desk. Please let me know what you think about this transition.

VIP Mike Nelson and Chief of Resource Management and Visitor Protection Carol Knipper have been taking pictures of your fellow VIPs for the staff and volunteer directory in the hallway of the Administration

Building. If you don't find a picture of yourself please let me know!

I would like to know when you are helping, so I have a calendar behind my desk for you to sign up for the days you will be here. For Tidepool Education and Protection Volunteers, please continue to sign up on the calendar in the library. I won't when I don't see VIPs around; so you will receive a phone call from me if I don't see or hear from you.

In November, the time will arrive for winter uniforms. We will switch from short sleeves to long sleeves. It is important to wear your uniform properly to maintain a professional appearance. Just a reminder that NPS policy prohibits wearing any part of the uniform when not performing official volunteer duties. If your uniform is missing items or any need to be replaced, please let me know as soon as possible so parts can be reordered.

Most importantly, please help us recruit new volunteers for your park! If you are willing, I have fliers for posting in appropriate areas.

I am here to make your experiences enjoyable as a Cabrillo National Monument volunteer. Let's chat! Call me at 619-523-4573 or e-mail me at Marcy_Marquez@nps.gov.

I thank each and every one of you for your dedication and the valuable time you give to Cabrillo National Monument.



Cabrillo National Monument Foundation

As some of you may know, Cabrillo National Monument Foundation is currently in the process of publishing a new book about the natural resources of Point Loma. The book is intended to provide an easy-to-read overview of the coastal sage scrub ecosystem and near-shore marine environment of the Point Loma peninsula. It will describe the ecosystems and the biodiversity of their plant and animal communities and will explain the interdependence of the populations of those communities. Throughout, the publication will stress the importance of preserving these precious and diminishing natural resources. In addition, it will describe the procedures currently under way for their preservation and restoration. Chapters will include geology, climate and oceanography, the near-shore marine community, plant communities, animal communities, human impact, as well as monitoring and management of the resources. CNMF members and friends of CNM will be the first to know when the book becomes available!

The new fiscal year began October 1, 2002 and two new trustees will join the CNMF Board: Bob Clopine and Bill Griswold. They will take over for two of our trustees whose terms have expired, Rick Garbini and Jim Nauman. We want to thank Rick and

Jim for their invaluable service to the Foundation and the park. Jack Damsen will step down as Board Chair and Ed Streicher will assume the chairmanship. Many thanks to Jack for his outstanding leadership.

Other elected officers of the Board are: Eleanor Neely, Vice-Chair, and Bob Clopine, Treasurer; Cynthia Nuñez will continue as Secretary. The other trustees are Richard Chavez, Reinhard Flick, Sal Giametta, Charles MacVean and Kevin Munnelly.

My sincere thanks to all the members for your ongoing support.

Karen Eccles
Executive Director

Make a Lasting Legacy



The CNMF Endowment Fund, established in 1997 with the San Diego Foundation, is another way you can support the endeavors of Cabrillo National Monument.

Interested donors can call (619) 222-4747 or log onto www.sdfoundation.org for more information.

CALENDAR

November 15, 2002

Old Pt Loma Lighthouse Anniversary

November 19, 2002

Moonwalk

February 1, 2003

Tidepool Talk

March 22, 2003

Bird Walk

April 26

Sunset at Cabrillo

May 26, 2003

Military History Talk

June 29, 2003

Cabrillo Drama

July 2003

Living History with Bob Munson

August 2003

CNMF Annual Member Meeting

September 2003

Bird Walk

DATES ARE SUBJECT TO CHANGE

New Members

CNMF welcomes the following new members joining from July 11 to October 15, 2002

Elbert Bailey
Raymond Black
Michael & Cynthia Bouvet
Andrea & Bobby Compton
Bruce Cook
Cynthia Diller
Ellis & Phyllis Dingwall
Patricia Fink
Allen & Judy Garrett
Betty Gouraud
Gladys Jones
Andy Kelley
Tom Kibler
Fritz Kunzel
Thomas & Sally Masterson
Mike & Sandi May
T.J. McCann
Victoria Moats
Ronald Ouellette
Mr. & Mrs. Robert J. Pringle
David & Alberta Sailors
David & Grace Shank
Robert Simpson
Helen Zimmerman



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Andrea Compton, Guest Editor
Jim Nauman, Production

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