

The Explorer

*Newsletter of Cabrillo National Monument
and the
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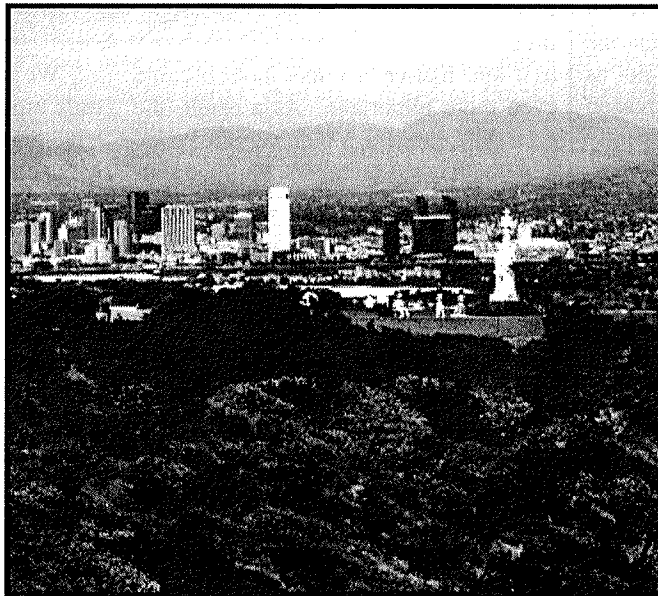
Natural Resources of Cabrillo National Monument

Two Worlds

by Edmond Roberts

My office offers the most spectacular view in Southern California—maybe even in the world. Bold statement, you say. Well, you may disagree with me, but that is what I truthfully believe! But is this important? I doubt it is any more important than the geographical tidbit that the tip of Point Loma is the southwesternmost point in the Lower Forty Eight. Yet, visitors to Cabrillo National Monument frequently seek confirmation of this bit of trivia. What many of these folks who come to enjoy the view fail to recognize is that surrounding us here at Cabrillo are two distinctly different worlds. These two sensitive worlds of nature—the coastal sage and the intertidal system—present Cabrillo National Monument with a challenge and an opportunity found in few national parks.

These two unique environments/ecosystems, the intertidal, and the coastal sage scrub, require an intensive effort by interpreters to inform the public about



them, thereby gaining public support for their preservation. Many people who have seen black scars on hillsides in

Southern California resulting from summer fires find it difficult to grasp the concept that this often unsightly, scrubby forest, with its highly volatile nature should be preserved. But a close look at this forest reveals a diversity seldom seen in most North American forests. The makeup of this system consisting of some drought-deciduous, some fire-dependent, and some salt-tolerant plants—many supporting an array of birds, mammals, reptiles and even a few amphibians—makes this an invaluable park resource. With less than ten percent of this historic forest remaining, and all of it found in coastal Southern California with its Mediterranean climate, how can we not take pride in preserving what is left? In recent years, the resource-management staff has made great strides in restoring this subtle but truly beautiful elfin forest to some sem-

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blance of its original state. In order to ensure that this is being correctly done, however, we need to understand much more than is now known.

But even less is known about the adjacent system, the dynamic intertidal area of Point Loma. What is understood about the intertidal area with its tidepools is that it is one of the most threatened resources of the monument. Compared to the coastal sage scrub, which is rapidly being restored, the intertidal after six years of research is still much of a mystery. We know that it is being stomped to death. We know that it is being loved to death. We know that the intertidal region is still the best example of a dynamic marine system. We also know that it is not as healthy as it should be. This is the reason that the park management team recently enacted a program of protection, education, and restoration. For this program to be successful, more information is needed. Therefore, one aspect of education is the continued monitoring of the intertidal area's condition and the effects of human activities in the area.

As you traverse either or both of these two areas, whether you are a visitor or staff member, look closely and enjoy the subtle beauty and diversity of these two unique and dynamic systems. They are constantly changing and providing new opportunities to learn. They represent two worlds, each having an effect on the other—perhaps somewhat similar to the New and the Old Worlds of Juan Rodríguez Cabrillo's era.

From the Superintendent

by Terry DiMattio

If you were to ask most people what they thought of when you said, "Cabrillo National Monument," I think most of them would say the view or perhaps the old lighthouse. I do not think that many of them would mention the natural resources that are found here.

Nevertheless, the natural resources here and on the rest of the Point Loma peninsula, are significant, and are becoming more important as Southern California grows and new homes and businesses are built. Not many people, visitors and colleagues alike, know that the

National Park Service has listed Cabrillo NM as one of 250 areas in the National Park System with significant natural resources. Over the past 15 years or so, these terres-

trial and marine habitats have become even more important. As a result, the park staff, rangers, Volunteers-in-Parks, and youth corps members, with the support of the Cabrillo National Monument Foundation, have been spending more time, energy and money to preserve them.

In this issue, you will read more about the research and resource management activities that are going on here and in the Point Loma Ecological Reserve. I would like to highlight a few of them for you that signal an expanded level of activity for the National Park Service.

We have made the commitment to institute a long-range inventory and monitoring program to protect the coastal sage/maritime succulent scrub and marine intertidal habitats at Cabrillo NM and in the Reserve. The tidepool monitoring pro-

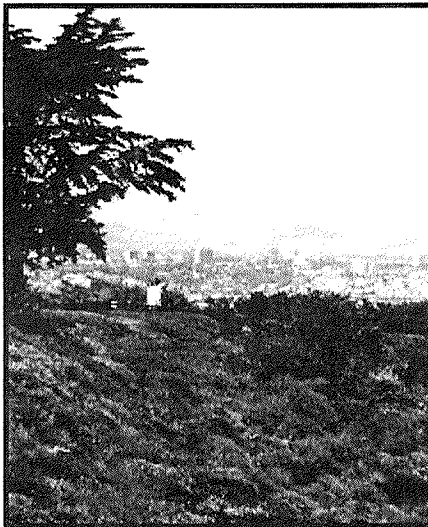
gram began with Gary Davis and Dr. Jack Engle in 1990. Their findings led to the implementation of our Tidepool Protection, Education and Restoration Program in the fall of 1997. That program continues this tidepool season. A critical component of its success is monitoring the condition of the tidepools into the future. Acting Chief of Natural Resource Science Samantha Weber is currently responsible for this monitoring program. With guidance from Gary and Jack and the help of many dedicated volunteers, she is converting it from a program done by outside scientists to one carried out

by the park staff and VIPs. To make this an integral part of our resource stewardship program, we hope to hire a marine biologist in the near future.



We also hope to implement a long-term monitoring program for our terrestrial resources. This spring, Kathryn McEachern, a plant ecologist with the Biological Resources Division, US Geological Survey, will return to show us how to establish a plant-monitoring program. In 1993, Kathryn conducted the first complete plant inventory of the park. Using park staff and VIPs, we would now like to implement a plant monitoring program for the monument and the Reserve so we can determine the condition of this diverse habitat and, if necessary, develop strategies for preserving it.

In time, we would also like to establish long-term monitoring programs for reptiles and amphibians, mammals, and birds. We recently learned that the monument, in partnership with Dr. Robert



I hope you will realize that Cabrillo National Monument is more than the view and the Old Point Loma Lighthouse. Here the National Park Service, its friends, partners, and neighbors preserve and protect significant, diverse, and fascinating natural resources for the enjoyment of this and future generations

Fisher, San Diego State University, received a grant from the National Park Foundation and the Canon Corporation to continue Robert's herpetological monitoring program. This program will provide the National Park Service and the other Reserve landowners with five years of valuable data on the number, type, distribution, and status of the reptiles and amphibians on Point Loma. Once Dr. Fisher's study is over, we plan to assume the responsibility for monitoring "herps" throughout the Reserve.

The importance of a comprehensive long-term monitoring program—tidepools, native plants, reptiles, mammals and birds—is that it will give resource managers the information we need to try to protect, restore, enhance, and interpret the significant natural resources on Point Loma. We are already using information from the tidepool monitoring program in our interpretive programs to enlist the assistance of our visitors—the owners of the tidepools—in the preservation of this fragile and threatened ecosystem.

As many of you know, we have been steadily implementing our Vegetation Management Plan over the past five years. Chief of Resource Management and Visitor Protection Carol Knipper and her rangers, Ely Edquid, Marty Lane, Joe Wilson and Mark Long, along with dozens of VIPs, Youth Conservation Corps, Urban Corps, and National Civilian Community Corps members, have been removing exotic vegetation from the monument and Reserve. Tons of the iceplant

Carpobrotus, acacia, and eucalyptus have been removed and the areas they once dominated restored with native vegetation. In addition, they have been gathering the seeds from native plants, and using the plants propagated from those seeds to restore eroded areas and social trails.

These resource management activities have had a significant impact on the park and have enabled the National Park Service to restore and enhance sensitive coastal sage and maritime succulent scrub habitats that were disappearing from Point Loma and the greater Southern California region.

The spring is a wonderful time to visit the monument and enjoy the subtle beauty of the native vegetation found on Point Loma. With all the rain we have had, we expect to see an abundance of wildflowers. As you hike the Bayside Trail or walk around the revegetated area near the Whale Overlook, I hope you will realize that Cabrillo National Monument is more than the view and the Old Point Loma Lighthouse. Here the National Park Service, its friends, partners, and neighbors preserve and protect significant, diverse, and fascinating natural resources for the enjoyment of this and future generations.

VIP

Cabrillo's Volunteers

by Mary Beth Vygrala

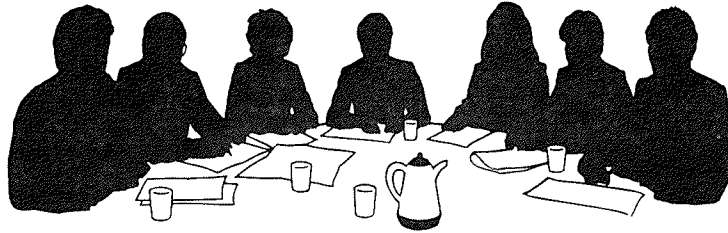
Both new and familiar faces have joined the ranks of Cabrillo National Monument's volunteer crew. Two familiar faces are those of our winter student interns. **Christiann Jeffcoat**, who is a Parks and Recreation major at SDSU, has returned for another semester internship. **David Nieman** who was a volunteer last fall is now doing his internship. He is a history major at Point Loma Nazarene College. Several volunteers came on duty last fall: **Lia Schraeder** is a graduate in history from SDSU and has been working weekends at the Visitor Center desk. **Sandra Turner** is a high school teacher from Redlands, California, who does costumed interpretation with fellow volunteer **Luke Bjerke** at the Lighthouse. **Anita Burkett** is a graduate in biology/zoology from the Evergreen State College and is Samantha's right-hand person. Anita does tidepool surveys and monitoring, herpetology surveys, and all sorts of natural resource science work. **Trissi Schonauer** is a student who works in the Visitor Center on Sundays. **Pam Zuckerman** enjoys talking to visitors at the Visitor Center desk and always wears a smile.

We hate to say goodbye to folks, but time moves on. **Bill Maier**, a ten-year veteran of volunteering here has moved on to a real job. **Gene Adams** has a paying seasonal job at Aztec Ruins NM in New Mexico; he may return to us 'm six months. **Gall Herrera** has moved with her sailor husband to Bremerton, Washington.

We can never say it enough :
"Thanks to all the volunteers who help make Cabrillo National Monument such a wonderful place."

Sharing ideas for protecting our intertidal resources

by Carol Knipper



The intertidal area at Cabrillo National Monument has long been an intriguing and popular area for San Diego visitors and natives as well as researchers and scientists. This rocky margin between the sea and the coast—alternately submersed and exposed, sometimes tranquil and at other times pounded by the surf—is a vital area of curious-looking animals that thrive in this harsh environment. But it is important to understand that it may be a barometer of changing ecological conditions and adverse human influences.

Even when Cabrillo was a developing park service area, the rangers had concerns about the tidepools and the amount of visitation in this fragile area. Although the intertidal area is not actually on park property, the park staff could not stand by and watch this resource become ravaged. This impact of visitors on this unique area was the impetus behind seeking and finally receiving a cooperative agreement with the Navy and the Army Corps of Engineers to assume administrative jurisdiction of this area in 1972. The park eagerly “adopted” this 1.2 miles of coastline and since that time we have continued to learn much about the fragility of life in the intertidal community.

Joy Zedler of San Diego State University conducted the first significant study of the tidepools in the mid 1970s. In her 1976 report titled “Ecological Resource Inventory of the Cabrillo National Monument Intertidal Zone,” she describes mapping the major intertidal communities and documenting the presence of 109 plant and 160 invertebrate species. She also documented the correlation between the various tidepool habitats and impact of human visitation. Zedler first outlined for the park the need to have more control of visitation in the tidepools and im-

proved environmental education; she suggested establishment of a monitoring program to assess long-term changes in the intertidal region.

In 1990 Dr. John Engle from the University of California, Santa Barbara and Gary Davis, Senior Scientist with the National Park Service at Channel Islands, applied their intertidal monitoring technique using indicator species as representatives of the condition of the ecosystem at Cabrillo. The results of this six-year monitoring program—funded by Cabrillo National Monument Foundation—have given this park the momentum and credibility necessary to take action to protect this important resource. According to Engle and Davis, the fact that seven of the 13 index species have

either declined significantly (along with their associated flora and fauna) or remain absent from the Cabrillo National Monument ecosystem is cause for great concern. But untangling the various causes for the decline is challenging. The park staff has taken every appropriate action to educate visitors with an expanded tidepool volunteer program, and the superintendent has used his authority to close an entire zone of the tidepool area so that we can monitor its recovery. Still we seek to know more in order to protect it better.

Cabrillo National Monument could not be in a better location to draw interest and help. The talent of interested, educated, and experienced people in this county is tremendous. The park managers felt that if we could bring these people together and focus them on marine quality issues and the declining condition of tidepool organisms, we could find the necessary steps to reach further into our understanding of the ecological condition. The park staff worked with the Water Resource Division of the National Park Service to develop an agenda. On February 4, 1998, twenty-three people from the federal, state, county, and city agencies and environmental consultants gathered at the conference center on the Point Loma Nazarene College campus to share their research and understanding of this complex area.

This meeting was significant in a number of ways. It was an opportunity for all of the participants to meet and acknowledge the National



Monitoring intertidal organisms: Gary Davis

Park Service's role in monitoring and managing the intertidal resource. It was an opportunity for the Water Resources Division of the National Park Service to acknowledge Cabrillo NM's role, and to Cabrillo it brought a realization that we had stepped across a threshold and needed to participate in this issue in the same league as research institutions and universities. Not all the concerns were at the research level: conference members spent time discussing public education and outreach (something that Cabrillo does well already) and communication. A large amount of data has been generated but little has been synthesized into meaningful information and passed on to those who can make the most use of it. Another concern was the need for time and money to work on projects effectively.

No, these issues won't be resolved overnight. But with the professional help we received from the conference members and the Water Resource Division's expertise in formulating action plans, we are developing a course of action. Our efforts will likely focus on identifying contaminants and other causes of the decline of California mussels in this area, and on water circulation. We realized that we needed to know how the water flows through this area and what is carried in the flow. We will keep up with our environmental education and expand it in any new way we think is feasible. And we will keep in contact with our neighbors who cared enough to participate in this gathering; we're on the right road and we have good companions.

I was delighted to put on this coastal resource meeting—it was a great learning experience. When I told Gary Davis, who is a wonderful researcher and friend of the park, about the enthusiastic response I got from the participants when I suggested the meeting, he said with a wink, "See, people like this park!"

Yes they do. Yes they do.

The end Is near

by Martin Lane

The Urban Corps is coming! The Urban Corps is coming!! That was the cry of one zealous ranger working with the vegetation management plan. The Urban Corps is not band of renegades destroying our native plant community, but a team of young adults who live and work in the San Diego area.

The Urban Corps of San Diego was established in 1989 to help young people achieve new skills, earn a high school diploma, and to become productive adults. Today they are here to help Cabrillo National Monument accomplish some of the objectives in the vegetation management plan. In exchange for their hard work, we provide educational opportunities to learn more about the native plants, tidepools, and geology of Point Loma. I awaited the day of their arrival eagerly. The team of seven would, in the next 20 days, help us eliminate the existence of an alien plant species known as *Carpobrotus*—AKA iceplant, hottentot fig, sea fig, and pickle weed. This rascal of a plant has many names but it is best known for choking off and killing native plants.

On the day of their arrival, we set our goals high. We started on top of the western slope by learning about a few native plants. Then the fun began—the pulling of iceplant. The young adults had been pulling the offending plant for half an hour when one of the seven spotted a snake. It was lying all coiled up on some gray, dry, and wrinkly iceplant. The team circled around to see the small reptile. I rushed over to the spot, and to my surprise I saw that it was a night snake (*Hypsiglena torquata*) coiled into the size of a half dollar. They all had been warned of the possibility of encountering snakes. This was only the second time that a ranger at Cabrillo National monument has taken a wildlife report on a night snake, mainly because they are so small and are usually nocturnal. These reptiles are harmless to people because of their small size and the location of their

teeth toward the back of the upper jaw, making it difficult for them to bite anything of great size. Using a hand tool, the snake was moved a few feet away where it would be safe from the work being done. With a little more caution, our team started to work again. Knowing that similar adventures would take place in the coming weeks, their excitement was mounting.

Now that the team had learned something about native animals as well as native plants, the massive assault on the iceplant began. We started using Round-up™ to kill iceplant that was growing on steep cliffs where it would be too dangerous to pull. As part of the crew sprayed an area, the rest of the group would pull the plant away from the native vegetation to reduce the chance of overspraying those natives we wished to keep. This worked quite well.

Pulling and spraying iceplant was not all the team would accomplish. As part of the vegetation plan, replacement with native plants was as important as the removal of the exotics. Approximately 200 natives were planted in areas that had been previously cleared of exotic vegetation. Along with the plants, seeds were dispersed and covered with an erosion-control blanketing. This was all done before the first of the anticipated El Niño-type storms would hit. A total of over 700 plants have been planted by volunteers, NCCC, park staff, and the Urban Corps.

Each passing day my excitement grew—I did not know how beautiful dying iceplant could be. The color was like that of a sunset on the hill side. The team of seven managed to remove or spray approximately 250,000 square feet—5 acres—of iceplant. It was an exciting 20 days, because now the end of the era of invasive iceplant at Cabrillo National Monument is in sight.

Thank you, Urban Corps.

Carpobrotus: just how native is it?

by Debbie Stetz

A walk around Cabrillo National Monument these days reveals a different appearance of the landscape compared to just a few years ago. Gone are the large tracts of showy iceplant that bordered the public walkways; it is slowly being replaced with new plantings of encelia, lemonadeberry, cholla, and other native varieties from the coastal sage scrub community. In accordance with the park's General Management Plan and in conjunction with the Point Loma Ecological Reserve, native habitat areas have been targeted for restoration by removing the non-native plants and replacing them with native vegetation. The most obvious exotic offenders have been the two species of iceplant, *Carpobrotus edulis* (fig-marigold or Hottentot fig) and *C. chilensis* (sea fig).

It is unfortunate, however, that this simple succulent with the pretty pink or yellow flowers has become such an attraction with our out-of-town visitors. When they excitedly ask the Ranger, "What plant is that?" we must gently explain, "It is an offensive invader, targeted for removal." "Oh," they say, but feel much better when further informed about the plight of the coastal sage scrub plant community.

But where did this unusual plant come from and how did it become so entrenched at Cabrillo National Monument? Or, for that matter, in California? According to *The Jepson Manual*, *Carpobrotus* belongs to the family Aizoaceae, of which there are 13 different species. Of the two *Carpobrotus* species, the yellow Hottentot fig was apparently introduced into California from South Africa, via Chile and Mexico, sometime during the 19th century. On the other hand, the pink sea fig is a mysterious newcomer.

Is sea fig a California native? The California Department of Parks and Recreation posed that question to Humboldt

State University scientists Susan Bicknell and Ellen Mackey in 1986. Department officials wanted to know whether sea fig should be included on their native plant list for protection, or on their exotic plant list for eradication. So the two scientists began their exploration into the history of sea fig, and came up with some interesting results.

Sea fig was first collected in California at Bodega Head in 1841. Bicknell and Mackey examined four possible ways the plants could have been introduced into California: natural dispersal by way of ocean currents; accidental introduction into ships' ballast; deliberate introduction by Europeans as a medicinal plant; and establishment by Native American cultures. The researchers concluded that dispersal by oceanic drift from South Africa to the south coast of Australia and then to the west coast of South America could have been possible, based on the direction and location of ocean currents. But they concluded drift could not have occurred from South America to California because northern Pacific currents travel in the wrong direction. They excluded mammals as a means of transporting sea fig from Chile to California because the distance would be too far for "timely terrestrial travel." But birds, who normally do not eat the fruit of sea fig, may have carried the seeds, which are coated by a sticky mucilaginous fluid, north to California in their feet and feathers, and subsequently cleaned them off at a far-distant location.

Bicknell and Mackey also determined that if sea fig had evolved in California, there would possibly be other closely related species. But there is only Hottentot fig, which has a well-documented South African origin.

And if sea fig had been present in California's prehistoric times, one might expect to find a record of it in ethnobotanical literature. There were about fifteen groups of California Indians whose



Where did this unusual plant come from and how did it become so entrenched at Cabrillo National Monument?

native homelands coincided with the current range of sea fig, and at least three are known to have eaten its fruit during more recent times, but there is no record of any earlier use. Bicknell and Mackey surmised that the lack of documentation about earlier use may be because ethnobotanists did not inquire specifically about *Carpobrotus*, or that Native American knowledge of the plant was lost before it was recorded.

So the finger begins to point to Europeans as the introducers of sea fig. But was it accidental or deliberate? There is documentation that *Carpobrotus* was used as a medicinal plant by native people of South Africa, but there is no recorded horticultural, agricultural, or medicinal use of the plant by Europeans. Accidental introduction by way of ships' ballast seems to be the most likely way sea fig was established in California, possibly by Sir Frances Drake in 1579 and/or by Sebastián Rodríguez Cermeno in 1594. Bicknell and Mackey explain their most interesting conclusion:

"The origin of Cermeno's ship is unrecorded. All that is known is that he

assumed command of the *San Agustín*, one of the Manila galleons, in the Philippines with instructions to explore the California coast on his way to Mexico. Manila galleons were built both in Spain and in Mexico. If the *San Agustín* were built in Spain, it would have had to sail around the Cape of Good Hope to reach the Philippines. It was common practice to take on fresh water, supplies, and ballast to replace consumed supplies along the coast of South Africa. Beach sand was a convenient form of ballast carried in empty kegs. Cermeno ran aground at Drake's Bay, leaving most of his cargo and ballast on the shore. He and seventy of his crew sailed on to Mexico in a launch they built from parts stowed on the deck of the *San Agustín*.

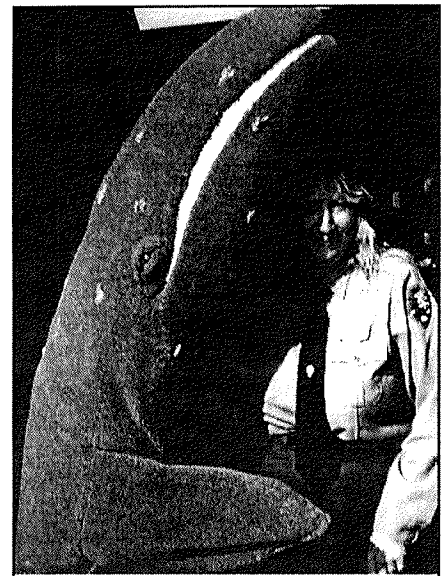
"Drake careened his ship, the *Golden Hinde*, at Drake's Bay (or some other nearby location) for repair of a bursting hull. This was the same ship Drake piloted around the world, including passage around Cape of Good Hope only two years before under a different name, the *Pelican*. Whether the ship did not land in South Africa, or whether the event was just not recorded, Drake does not mention it in his diary.

"Documentation of early voyages is sparse, but early voyages were numerous. The Spanish Manila galleons sailed from the time of Spanish conquest of the Philippines in 1565 until Mexican independence from Spain in 1822. Spanish rule limited the number of ships to one per year in 1593. Spanish shipping traffic alone, not considering British, Dutch, and other nationalities, would have brought over 200 voyages past the coast of California following the route of Cermeno. Landfall was not common because currents and winds provided for speedy passage to Mexico from the North Pacific. But many opportunities existed, and Cermeno's ship is not the only one lost along the way. We know that in the late 1500s at least two ships with opportunity to take on ballast in South Africa ran aground and dumped ballast on the coast of California. Landfalls of both Cermeno and Drake were near the original botanical collection of sea fig at Bodega Bay."

Their findings are interesting, but

speculative. The origins of sea fig are still debatable; just check your *Sunset Western Garden Book* which lists the plant as native along the coast from Oregon to Baja California. But it appears certain that the plant is an introduced species and has become naturalized to the California soil. Although we may never know its true origin, we do know that *Carpobrotus* was "discovered" in California during the mid 1800s; since that time, it has become a horticultural favorite. It thrives in an arid climate, requiring little to no watering, while producing an abundant carpet of day-glow pink and yellow, daisy-like flowers. It was once considered a perfect plant for erosion control, but time has shown that this heavy, shallow-rooted succulent can cause mudslides when the soil becomes saturated.

But in 1935 *Carpobrotus* was deemed the ideal choice for the first landscaping project at the Old Point Loma Lighthouse. In that year, when the lighthouse was undergoing a major restoration, residents of Sunset Cliffs donated 8,000 cuttings of "ice plant" to the National Park Service for use as an ornamental bedding plant. Since that time, those plants have extended beyond their original boundaries and have relentlessly invaded the native plant habitat. Since it has not been determined that *Carpobrotus* is a native plant, the park staff has targeted it for removal. So, these days as you walk through the park, you will see more and more areas that have been cleared away by park staff and generous volunteers to make room for the delicate native plants of the coastal sage scrub community.



Whale Watch Weekend

by Mary Beth Vygrala

Visitors had a whale of a weekend on January 17 and 18, 1998.

Approximately 5000 people came each day to learn about and view the migrating gray whales. Exhibitors from Sea World, San Diego Natural History Museum, Stephen Birch Aquarium, and American Cetacean Society set up booths in the breezeway. A volunteer from the Aquarium made a splash dressed in a gray-whale costume. He joined Cabrillo National Monument volunteers and Sea World staff in a "Whale of a Tale" puppet show. Sea World representatives showed a video of JJ, the rescued gray whale who is to be returned to the ocean this spring. Speakers also included Margie Stinson, François Gohier, Jim Peckarsky, and Dr. Sam Ridgway. Visitors spotted whales both days; we were glad to have avoided a wet El Niño weekend. All in all the weekend was a whale of a success.

Birth of an education program

by Emily Troxell

For years, Cabrillo National Monument has provided educational programs for elementary-school classes. Each program has evolved over the years so that our curriculum reflects both the mandates of the National Park Service and the goals outlined by California's educational system.

What steps are necessary to set these programs into motion? A variety of factors must be considered. First, we consult the curriculum guides provided by the state and local departments of education, where clear objectives dealing with content are outlined. This material is used to determine both the grade levels and appropriate content.

A second source of direction comes from the National Park Service. Considering the mandate in the NPS Mission Statement for protection and preservation of resources, a variety of approaches can be undertaken. The intertidal area at Cabrillo NM provides a good example for the purpose of discussion.

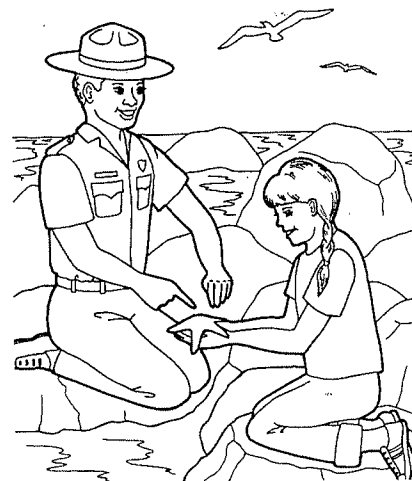
Grades 3-5 are required to study basic biology and specifically intertidal habitats. At Cabrillo we are able to provide the field study to support classroom experiences. Using techniques similar to those employed in the park's tidepool monitoring program, students not only learn to identify various species, but have a chance to make observations

about the occurrence, feeding habits, and life patterns of those organisms.

Next, we must develop the physical operation of the program. The first concept addressed is the adaptation of plant and animal species to the habitat. In the first step, which is covered in a lecture format, we give the students information about how to identify specific organisms and their location within the intertidal zone. The second step provides field work in species identification. Students set up study sites similar to the ones the park staff uses in the tidepool monitoring study; then, using animal inventory sheets, they count the species present. Once students obtain competence in identification, the class enters into discussions leading to understanding of the specific adaptations that permit a given organism to thrive in a certain zone of the intertidal area. This step is far more important to the understanding of the habitat than simple identification of species.

The final aspect is the development of hands-on materials that will make the program work. How will the students know what to do? Task assignments need to be made for each participant. Work sheets must be devised to direct study. One sheet addresses identification and counting; another needs to address observation techniques. One sheet must deal with the reason certain species are found in specific areas. How are stu-

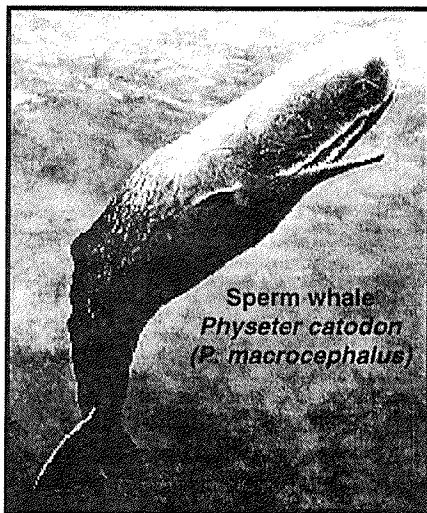
dents going to review adaptations? The ranger will identify and describe common animals and explain where they are found in the intertidal. How are groups going to mark a study area? They will use a rope to form a rectangle around a rock or other area where organisms are living. How do



parents know how to help? Adult leaders need clear directions about their role in the process. When all this is assembled, it needs to be packaged into workable units that are easily handled.

What are the results? The students receive a valuable field experience satisfying their educational requirements, and they generally find the experience stimulating. The National Park Service receives many benefits. Students having knowledge of intertidal mechanics will be more accepting of management policies. As an added bonus, the young people are exposed to career opportunities within the park service. These students, of course, are the adults of the future. With a positive attitude toward the park system and its mission, it is hoped they will be life-long supporters of the National Park Service. This becomes a win-win situation!





Sperm whale
Physeter catodon
(*P. macrocephalus*)

Historical whale bones and other stuff *by George Herring*

"There are many whales . . . for we found many of their bones."

Sebastián Vizcaíno

Sebastián Vizcaíno, who explored the coast of the Californias in the wake of Juan Rodríguez Cabrillo, appears to have had little interest in whales beyond one casual observation. While researching early explorations of California, however, I did stumble across some interesting references to whales by the observant Fray Antonio de la Ascensión, who accompanied Vizcaíno in 1602. In his "Brief Report of the Discovery in the South Sea" Fray Antonio takes a great interest in them, in fact. Actually, the interest is less in the whales themselves than in a product of their intestines known as ambergris.

Before Vizcaíno, perhaps even before the Spanish arrived in the New World, the coast north of Mexico was known for its whales. By Vizcaíno's time Alarcón's discovery that Baja California was a peninsula separated from the mainland had been forgotten and the Spanish managed to convince themselves that California—all of it—was an Island. The sea between the island and the mainland Fray Antonio calls the "Mediterranean Sea of California," but, "On the old maps it is called the bay, or gulf, of Ballenas, [Spanish for whales] because there are so many whales that they cannot be numbered, nor would it be believed by anybody who had not seen them."

Today, Bahía Ballenas is a place name for the coastal indentation off the

lagoons of Magdalena. It is here that Sebastián Vizcaíno made his one reference to whales: "There are many whales, which are sometimes stranded on the beach of this bay, for we found many of their bones." It would seem almost certain that it is gray whale skeletons, probably unfortunate calves, that he is referring to.

Evidence of a large population of sperm whales was found as well. Not far up the coast, at the Port of San Bartolomé (a little south of the Island of Cedros), Fray Antonio made this observation:

"Here and all along this coast there are many whales, and, if it is true that amber(gris) comes from their filth, as I understand, from what I saw on this voyage, there must be much amber on this same coast, we found another port . . . on whose shore was a large quantity of ambergris, in cakes, like soft, whitish pitch. We did not recognize it as such, and for this reason we took no notice of it. Afterward, when giving a description of it to those who were well acquainted with amber, they said that it was very fine ambergris."

So what is ambergris? A quick look in the *Encyclopedia Britannica* provides this unflattering definition: Ambergris is a solid material that forms in the intestines of sperm whales that was very valuable as a spice in Eastern countries and as a fixative for perfumes in the West. It is thought to form as a collection of feces around the indigestible parts of squid and other prey of the sperm whale. When fresh it is soft, black, and very odoriferous, but when exposed to sun, air, and sea water, it hardens, fades, and develops a pleasant scent. Pieces are usually small, but one was found that weighed 922 pounds!

No wonder the good father took little

notice of the substance when he first saw it.

More of the stuff was found in San Diego: "On the sandy beach which I said was in this harbor we found some large pieces, like adobe, brown or dark red in color, and very light in weight, like dried cow dung. They had neither a good nor a bad odor, and they are said to be amber. If this is so, there are great riches and an abundance of amber here." If it wasn't ambergris, I don't care to speculate on what this gunk was.

One more reference is given to whales farther up the coast, near Carmel (Monterey): "On the beach was a dead whale, and at night some bears came to feed on it."

Well that's it—just some interesting stuff from a biologically oriented history buff for my naturalist friends.

Source: *Spanish Exploration in the Southwest, 1542-1706 — Original Narratives of Early American History*. Edited by H. E. Bolton. © 1908 by Charles Scribner's Sons.

Whale watching

by John Golda

For many people, whales are a symbol of our hope in the resilience of nature in the face of human ignorance and destruction.

For many of us who live and work so close to the ocean, it is easy to forget how awe-inspiring and amazing the water can be. For visitors from the landlocked, inland areas of this nation, and perhaps the rest of us as well, the ocean can represent an exotic, alien world that might only be glimpsed through the flickering images of the Discovery Channel, the prose of Melville, or the lyrics of Jimmy Buffet. What better symbol and ambassador of that mysterious and foreign world than the whale? Whales represent the wonders and mysteries of the sea, and a symbol of hope for the future to many visitors. Thousands of visitors are drawn every year to Cabrillo National Monument in the hopes of seeing whales, and the reactions of the people who see them have always filled me with a sense of inspiration.

Of the world's eighty-odd species of whales, the Pacific gray whale (*Eschrichtius robustus*) is the most predictable and easiest to view from land. We see a considerable number of these whales at Cabrillo National Monument during the winter months. They are of a scale and live a life that we can only marvel at. A full-grown gray whale may reach a length of 45 or 50 feet and weigh up to 45 tons—the equivalent of four adult African elephants. To us, that may seem huge, yet when compared to the blue or sperm whale, gray whales are not particularly large. Despite their mammoth proportions, whales exhibit a grace and fluidity of movement that reflect their watery habitat. As mammals, they have turned their backs on dry land and forever taken to the sea. I've have met more than one person who would

willingly do the same.

As I stood along a path near the lighthouse, a visitor excitedly burst out, "There!!" and pointed towards the horizon. In the distance, a small white plume shot into the air and disappeared on the ocean breeze. A mixture of thrilled gasps and sighs rose from the people gathered around. A Pacific gray whale had risen to take a breath and had slipped again beneath the surface, as it must have done countless times before. But for these visitors, this breath provided an intimate connection to the whales and to the ocean

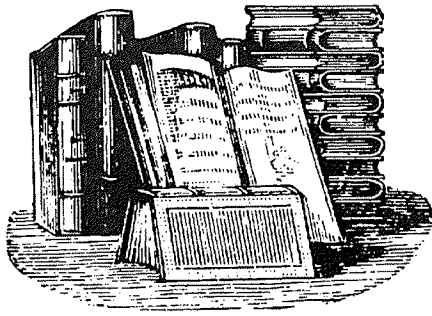


as a whole. Whales embody some of the essential, mystical qualities of the sea. They are awe-inspiring, mysterious, and almost unbelievable. One knows they exist and understands them intellectually, yet a part of us scarcely believes that something so huge can really exist. For a brief time each year, as the whales migrate past, one can see their spouts, or their flukes, or even their bodies as they leap from their world, only to crash back into the water. At that moment, whales become concrete, they become real. One can see the change take place in the faces of the visitors; they themselves have made a leap into a strange new world. They see the whale and begin to imagine, and to understand.

For many people, whales are a symbol of our hope in the resilience of nature in the face of human ignorance and destruction. Despite long years of hunting and brushes with extinction, the number of gray whales has rebounded. They show us that we can help make a difference, that we can turn the tide before it's too late. All it takes is the desire to understand and to change the world. As you look down onto the water and the whales from Cabrillo, you can get the sense that almost anything is possible.

I stood watching whales with several visitors one morning. As we watched a whale surface and spout, a man from the Midwest stood nearby and literally glowed—he beamed a brilliant smile. He looked at the whale and then at me and said, "This is the first whale I've ever really seen. It's ... it's incredible!" His six-year-old daughter tugged at his pant leg and whispered, "Dad, this is my first whale, too." He grabbed her up in his arms and they stood together in awe as they watched the whale swim out of sight. As I watched them I knew that they would leave with a memory that would forever tie them to each other and to some of the mysteries of the sea. To this day, I have no idea who was most impressed with what they had the opportunity to witness—they or me.



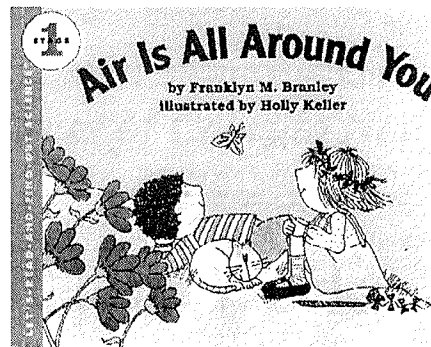


What's new at the Cabrillo National Monument Bookstore

by Mary Northrop

The bookstore in the visitor center at Cabrillo National Monument, operated by Cabrillo National Monument Foundation, stocks a wonderful series of books called "Let's-Read-and-Find-Out Science." One of these, *The Air Is All Around You*, written by Franklyn M. Branley and illustrated by Holly Keller, is a Stage One book, written for preschool and kinder-

garten-age children. Included are simple experiments which aid in the understanding of scientific concepts such as the fact that air exists even in water! One of our more popular titles, *Baby Whales Drink Milk*, by Barbara Justen Esbensen and illustrated by Lambert Davis, is also a Stage One book in this series. After you have mastered Stage One, we suggest you continue your education with Stage Two. *Ant Cities*, written and illustrated by Arthur Dorros, explores the different types of ants and their respective jobs in the colony. *Snakes Are Hunters* by Patricia Lauber and illustrated by Holly Keller, explains the physiology of snakes,



how they eat, why they shed, how they move, and more. *Earthquakes* by Franklyn M. Branley, illustrated by Richard Rosenblum, addresses the causes and effects of earthquakes and offers sci-

entific experiments that you can do to help understand them. If you think you know it all and that these books are too simple, come on in to the Visitor Center and check them out. You may even end up learning something! Amaze your family and friends with your newly found knowledge.

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Staff:

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George Herring
Debbie Stetz
Emily Troxell
Mary Beth Vygrala
Samantha Weber
Bill Armstrong

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