

Tales from the Cambria Woods



A Collection of Essays About Our Forest

MARCH 2002

The Cambria Forest Committee

Preface

The essays in this booklet originally appeared as a series of front-page articles in *The Cambrian* between March 1998 and April 1999. Galen Rathbun, Dave Krause, and Mark DiMaggio recruited the authors, with the objective of assembling a diverse perspective on the natural history of our forest. To preserve the personal nature of the essays, Galen and Lynn Rathbun and Kathe Tanner of *The Cambrian* did only minor editing for style, grammar, and length (but not content).

The Cambria Forest Committee (a pending non-profit public benefit corporation) has assembled the original essays into this booklet with the hope that Cambrians will find the articles interesting, informative, and useful in understanding our forest. Unfortunately, high printing costs prevented the use of the original colored photos by Brad Seek that accompanied many of the articles. Aldridge Design did the arrangement and layout of this booklet with guidance from William Hanna, Galen Rathbun, Rob Trask, and Rick Hawley. The illustrations in this booklet are by Lynn Rathbun, Art Van Rhyn, Judy Lyon and Linda Warren Seek.

Presently, under the aegis of the Cambria Forest Committee, a \$100,000 Grant from the California Department of Forestry and Fire Protection is funding the development of a Forest Management Plan for the Cambria area. The Committee, with administrative support from the Cambria Community Services District, has contracted with the Sacramento firm Jones & Stokes to develop the plan and implementation strategy. A series of newsletters and workshops will keep the Cambria community informed of progress.

Financial support for the publication of this booklet was contributed by the California Department of Forestry.

The Cambria Forest Committee dedicates this collection of essays in memory of Linda Warren Seek, a remarkable lady who loved our forest with a passion, and who inspired so many to do the same.



Linda Warren Seek

Forward

By Shirley Bianchi, Supervisor
San Luis Obispo County 2nd District

The natural beauty of California's Central Coast, including both northern San Luis Obispo County and southern Monterey County, is unequaled anywhere in the world.

Toward the north tree-covered mountains march right to the sea, sometimes ending in magnificent high bluffs, at times shrouded in fog, at times glistening in brilliant sunshine. Toward the south the mountains soften into hills, covered with grass and a variety of rare and endangered plant life with exotic names like compact cobwebby thistle or Chorro Creek bog thistle. Deep canyons with Spanish names intersect the landscape and their creeks empty into the Pacific Ocean—canyons and creeks named Arroyo de la Cruz, Arroyo Laguna, San Simeon, Santa Rosa.

The major community on the Central Coast is Cambria—a small town by today's standards—but a town that loves its rich Portuguese, Swiss and Welsh histories. Cambria has many residents who work very hard to protect its unique Monterey pine forest, agricultural lands and history. To these hard working people, this forward is dedicated.



Linda Warren Seek

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Introduction

By Mark DiMaggio

The first time you drove up Highway 1 you couldn't quite believe your eyes.

What is this?

A pine forest growing right up to the beach this far south? You thought (unconsciously perhaps) that this isn't a natural forest, just a bunch of trees that spread after someone planted them. That is, after all, how some of the extensive eucalyptus groves in southern California came to be.



Lynn Rathbun

But now that you live here, you know very well that this is a natural forest. And it is, to a large degree the forest that makes Cambria so magical.

God's pocket, as a friend and I call it. Or as Ralph Waldo Emerson once wrote, a place "whose groves the frolic fairies planned." A "relict endemic." A forest whose range was once far greater than at present. A victim of the end of the ice ages and a warming climate.

We Cambrians marvel and count our blessings and give thanks that this place has somehow escaped the extreme overdevelopment that has forever changed the southern third of the state. And we all share a common interest; to maintain

the quality of life that brought us here in the first place. It is indeed a joy and a privilege to live with this forest.

It can also be a pain in the neck.

Monterey pines are notoriously "wind fragile." Many Cambrians fear a tree may arrive uninvited into their living room on a stormy night. Then there is the regular interruption of electrical service during storms—typically the result of a falling pine severing a power line.

And what about the fire hazard? After all, this is a fire-adapted forest, one that has co-evolved with fire as a regular purge of diseases and aged trees. When will the next one sweep through?

But clearly, we who live here do so despite the headaches. For us, the benefits far outweigh the drawbacks. We're willing to take our chances with falling trees.

And because we intend to insure that this forest endures, we take it as our duty to care for it, and to learn to live with it, as a part of it. Living with a forest comes with its responsibilities.

Perhaps chief among these responsibilities is that we must educate ourselves. We need to know so much about this forest!

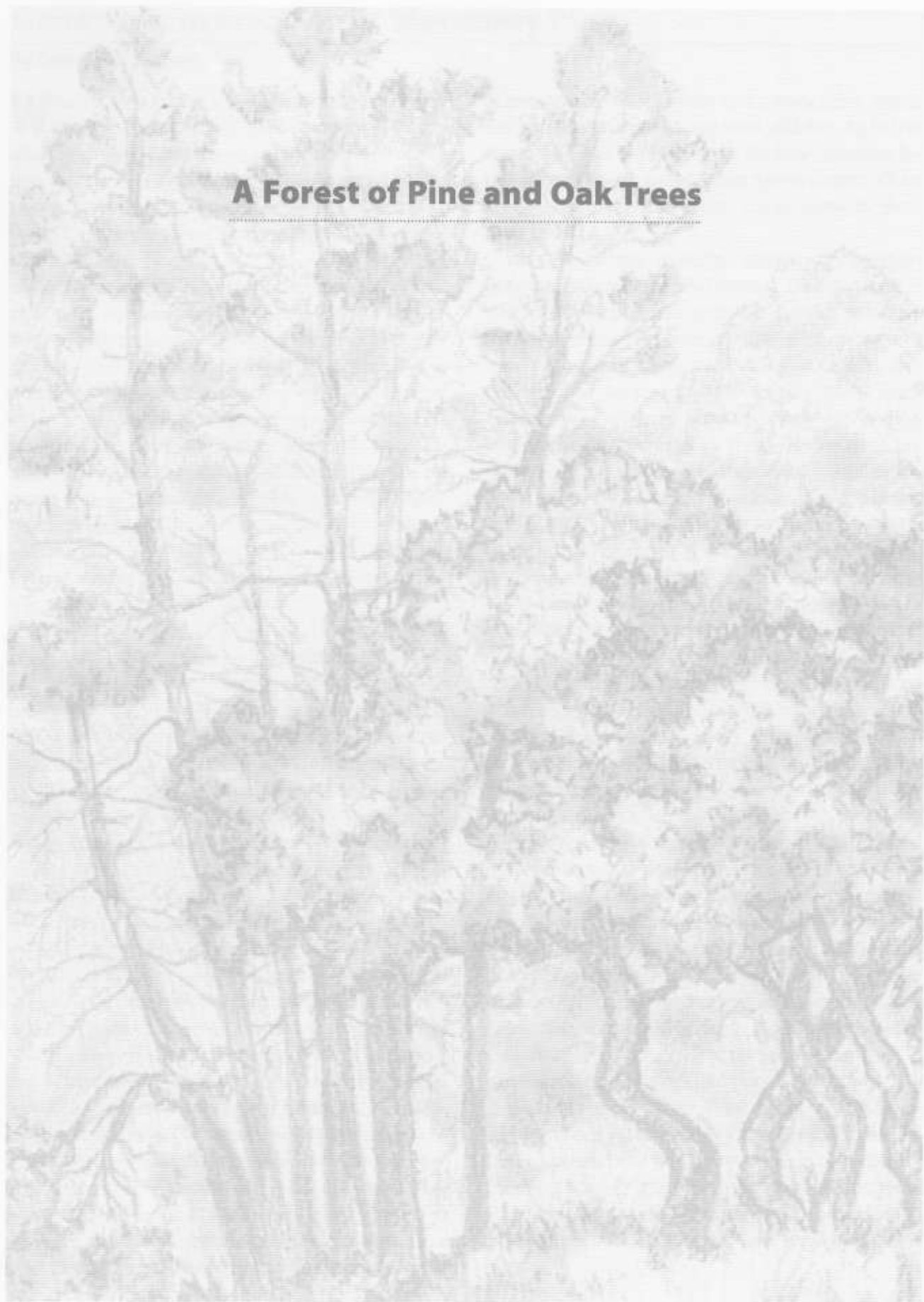
Where else do Monterey pines grow? How many different kinds are there? How did the Chumash use the pines? Do these trees require a periodic fire? What's the best way to trim a Monterey pine? What other types of plants and animals live in this forest? What about insects? And what about pine pitch canker?

What about construction practices in a Monterey pine forest—what's the best way to build to minimize disruption of the trees?

Welcome, Cambria, to a new series of essays bringing you answers to these questions and many others. With the community dedicated to understanding and becoming involved in issues regarding trees, we can ensure a healthy forest for Cambria far into the future.

Enjoy the essays!

A Forest of Pine and Oak Trees



The Puzzling History of the Cambria Pines

By David Chipping

This article is dedicated to the memory of Linda Seek, who did so much to protect Cambria's pine forest, one of its most precious natural resources.

One of the great mysteries of California botany is the current distribution of Monterey pine forests. In the Cambria area the tree is confined to well drained, sandy soil above 70 million year old sandstone of the Franciscan formation. Pines are absent on heavy clay above shale, which is more typical of the Franciscan formation. Local distribution is clearly defined by soils, soil chemistry, and texture of bedrock.

The tree is also a 'fog-belt' plant, and also abhors frost. But climate and geology do not explain the tree's absence along the Big Sur coast, or to the north of San Francisco, even though planted trees do well in these locations.

North of Cambria, the next population of Monterey pines is in the Monterey Peninsula-Point Lobos area, and a third is just north of Monterey Bay at Año Nuevo. These northern trees are different from the Cambria types, most obviously having smaller cones, which might be expected from populations with no genetic interaction. But similarities indicate that both evolved from a common stock.

Monterey pines, like much of California's vegetation, are adapted more to a climate than to a place. Daniel Axelrod of the University of California found from fossils that plant communities have moved large distances with past changes of climate, allowing juniper and pine to cover the Mojave, and redwood forest to extend to Santa Barbara. Ice ages have cycles that have lasted as short as 23,000 years, and as long as 100,000 years, in which these major vegetation shifts have occurred.

One theory holds that the much lower sea level of the Ice Ages (as much as 400 ft. lower due to the water being trapped in continental ice sheets) may have exposed suitable terrain offshore from the current Central Coast. This habitat is now drowned by the higher sea level of the current Interglacial period. Another theory holds that the climate has periods of much greater rainfall, probably associated with an ice-age, which would allow the pine to

occupy a broader range of habitats, some perhaps much further from the coast than at present.

Around 10 million years ago, ancestors of the Monterey pine covered most of the western Coast Ranges, associated with warm-climate plants that resembled species now found in central and southern Mexico. In the Pliocene epoch, between 1.6 - 5 million years ago, Monterey pine ranged from the Golden Gate to Mount Eden, west of Hemet. The Pleistocene (1.6 million years to 11,000 years ago), still finds the pine at Rancho La Brea and in the vicinity of the Golden Gate. Was it in Cambria during those times? We can only guess, but the chances are that the tree is a relative newcomer, running ahead of the rising sea level as it hugged the coastal fog belt. Like today, if it attempted to migrate into areas with the wrong soils, its eastern advance would end.

As we enter a new age of global warming brought about by man's activities, what will our climate be like? If our climate changes, what will happen to our small, fragile stand of pines in Cambria?



Linda Warren Seek

The Remarkable Pine

By Bill Libby

Cambria's native pines belong to the species *Pinus radiata*. Many people call those that grow here "Monterey pine," but it is useful as well as more accurate to call this substantially different native population "Cambrian pine." However, 99.9% of the *Pinus radiata* trees now growing on Earth are called "radiata pine" in English-speaking regions, or "pino insigne" and "pino radiata" in Spanish-speaking regions.

Most of the trees in this species are in the Southern Hemisphere, on about 3,750,000 acres in Chile, 3,500,000 acres in New Zealand, 2,000,000 acres in Australia, and the rest in South Africa, Spain, and about a dozen other countries. It wasn't always thus. Two hundred ten years ago, all of the *Pinus radiata* trees on Earth existed in five small populations: on Cedros and Guadalupe Islands of Baja California; at Rancho Santa Rosa (Cambria), the Monterey Peninsula area, and near Point Año Nuevo on the mainland of Alta California.

In 1788, seeds of these pines were sent from Monterey to France, where they were grown in Paris and soon given the scientific name *Pinus californiana*. In 1831, David Douglas sent more pine seeds from Monterey to England and Scotland, and suggested the scientific name *Pinus insignis* for the species. This name signified its "remarkable" qualities of rapid growth, dark green color and pleasant fragrance. However, *Pinus radiata* soon became the accepted scientific name and "remarkable pine" never really caught on.

The spread of this remarkable pine occurred in three major phases. The 1800s encompassed a period of scientific study and plantings by tree enthusiasts. In some areas, it was rapidly adopted for urban and amenity plantings, and several modest plantations in South Australia and a few in New Zealand were established. Most of the seeds for these had come either directly or indirectly from the populations at Monterey and Año Nuevo. One highly successful plantation had been established in 1866

near Auckland, New Zealand, with the seed source recorded as "Santa Rosa." This plantation was later felled and milled, but there is no record of seeds having been collected from it.

During 1900-1950, major plantation programs using radiata pine were begun first in South Australia, then New Zealand, and then Chile. Their purpose was to supply much or all of the wood needed in these three regions. Few or no genes

from the Cambrian pines are included in these or later radiata pine plantations, which were mostly established using seeds from existing plantations.

Since 1950, the plantation areas of radiata pine in Chile, New Zealand and parts of Australia have expanded far beyond those needed to satisfy domestic wood needs. In 1998, for every tree of *Pinus radiata* growing in the five native populations, approximately 1,000 are growing in plantations. In Chile and New Zealand, native forests are no longer needed as a source of wood, and they rank #1 and #2 on Earth with respect to the per-

centages of their original native forest now in parks and reserves. Radiata pine plantations made that possible.

By 2020, if nothing goes seriously wrong, radiata pine will be the #1 earner of export income in New Zealand. Furthermore, as the availability of this plantation-grown wood reduces the need to cut in Earth's more-fragile forests, some of these can also be set aside in reserves. If conservation organizations, governments and others manage to reserve such more-fragile native forests, these radiata pine plantations will have helped prevent or at least delay the extinction of hundreds or even thousands of threatened and endangered species per year. Cambrian pine genes may well play a role in that future.



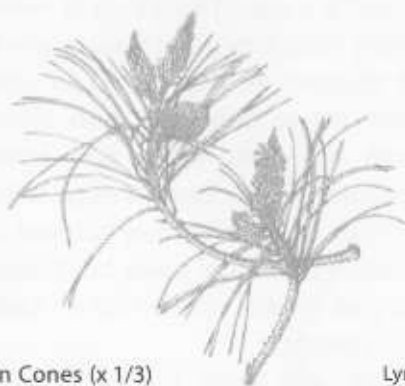
Lynn Rathbun

Pollen in the Pines

By David Krause

February is the time for sex in our forest—*pine* sex, that is. The creation of new pine trees begins with the appearance of yellowish male catkins near the branch tips of the pine trees, and then copious amounts of pollen are produced. Suddenly, we begin to notice puddles from recent rains that have accumulated a yellowish film.

Cars parked outside get a golden dusting. Sidewalks, driveways, decks, and porches carry a layer of saffron powder, which reflects footprints of those who have passed. Those normally transparent spider webs on our houses become quite apparent, each beaded with its own captive pollen grains.



Male Pollen Cones (x 1/3)

Lynn Rathbun

Pines are wind pollinated and this tremendous mass of blowing yellow “dust” increases the chances that every female cone will be inseminated. Surprisingly, the weather seems to accommodate this reproductive effort by providing periods of dry and windy conditions, which allows the pollen to be deposited on the awaiting female cones.

To help assure that trees do not fertilize themselves, the pollen-producing catkins are located lower on the tree, usually on side branches. The new cones, appearing higher up, are small reddish knobs near the tip of terminal branches that await the pollen drifting on the breeze.

The theory is that pollen from other trees is more likely to pollinate the cones with this arrangement, and thus achieve cross-fertilization.

Even though pollination occurs during late winter, fertilization of the pine ovule (egg) will not occur until 15 to 24 months later. The internal events that lead to seed formation seem to be one of those pon-

derous processes of nature. Meanwhile, we forest dwellers await the end of pollen season, which will mean less sneezing and cleaner cars and houses.

The new crop of cones will not be ready to shed their seeds for about three years from the time of pollination. This does not necessarily mean that these mature seeds will be released from their cozy cones when this time arrives.

Monterey pines are considered to be one of the closed-cone conifers, a group that also includes other species of pines and cypresses. Cones of these species can persist unopened on the tree for many years, and differ from those of most other conifers in that the cone scales remain tightly pressed together protecting the seeds inside. The enclosed seeds can remain alive in the cones for long periods of time, as much as 40 years in the case of the Santa Cruz cypress.

The trick to getting the closed-cones to open is heat. I was surprised one morning to find a mass of winged seeds around a basket of cones on our hearth after a nice warm fire the previous night. Out in the forest, the heat required to open the cone scales of most closed-cone conifers comes from a forest fire that kills the parent trees.

The seeds fall from the newly-opened cones onto the ground, where they readily germinate in the newly enriched soil. An example of this process can be seen on West Cuesta Ridge, where the Sargent cypress grove burned during the Highway 41 fire.

Lucky for us living in Cambria, Monterey pines have semi-closed-cones. Our pine cones will open merely in response to the heat of a warm day.

Have you heard the distinctive “popping” on one of those warm, still days in the fall, and watched the winged seeds helicopter down to the ground? This is the reason we see pine seedlings and saplings scattered in our mature Monterey pine forest without a recent fire.

Spring cleaning is more of a chore here in the forest with the addition of the yellow “dust” to skylights, decks, and bird baths. However, this is a small inconvenience for the enjoyment I get from living among the pines in Cambria. Without the pollen there would be no sex in the forest—indeed, no forest!

Cambria Fog

By Brad Seek



Lynn Rathbun

The Chumash Indians viewed fog as a living being that had an interconnected history with other entities. Medicine people were entrusted to ensure due respect for fog because it was recognized not only as a spiritual vehicle, but also as a contributor to the abundance of acorns, seeds, fruit, and game.

For most of us it is hard to view the fog as being anything alive at all. Any meteorologist can explain the phenomenon in detail and predict its coming with reasonable accuracy. The facts are hard to ignore, yet in a few hundred years our understanding of fog may be quite different. Today's meteorology might even be recorded as tomorrow's mythology.

Since I won't be around to see how this story unfolds I tend to spend more time observing the way fog interacts with our local environment. It can intersperse with trees like finely meshed gears and also add a veil of mystery to our lush green forest. It can interact with a deep blue sky in repetitive patterns or settle in a valley like a cottony cushion. A spider web becomes so laden with moisture that its design is revealed through strings of translucent pearls.

As a photographer, I enjoy the diffused light effects from fog on flowers and plants. It enables me to record the detail without having to worry about direct sunlight and dark shadows. On several occasions I have steadied my tripod and pointed my camera at a subject catching the moment—recording a drop precariously hanging from a leaf, flower, or even a sleeping insect. In the time it takes to set up my camera, wait for the air to still, and

click the shutter, several drops can fall to the ground. A weary companion may view this as my attempt to reinvent the water clock.

Our Monterey pines seem to be particularly adept at capturing this ephemeral water source. A pine only 15 feet high may have as many as 50,000 needles, each capable of condensing fog to visible droplets. As each droplet grows, gravity eventually pulls it to the ground. The fog drip from a large pine can sound like heavy rain, as it wets the soil beneath it. But an open patch of grass 30 feet away from any pines will remain silent and dry. During our summer season, when there is virtually no rain, fog drip can be a welcome source of moisture.

Obviously, Monterey pines have figured out how to water themselves, but a host of other living things also derive benefit. A bird searching for insects can also glean water from needles. Soft bodied animals such as banana slugs, salamanders, and tree frogs can move freely without dehydrating. A modest canopy of pines can support a lush understory of smaller plants that in turn support other living things.

When my wife Linda first introduced me to Cambria in 1973, I was delighted and puzzled to witness a pine forest so near the coast—in my mind this type of environment was usually found at much higher elevations inland. I now understand that our pines would not exist here were it not for the coastal fog. The fog also defines the inland boundary of the pine forest.

And now as I enjoy the sunny and warm days of fall, but endure their cool nights, I say farewell to the summer fog. I view this phenomenon both as tangible and intangible. I see the coastal fog as entering into a state of hibernation. It will go to sleep in the ocean, but occasionally wake up in the off season to have a look around.

But for now, the summer fog has bowed to the fall, then the prolific but fickle winter and optimistic spring.

Then, at just the right time next summer, this armada of micro droplets will sail into our forest to challenge the senses and sustain the living things we are so accustomed to seeing.

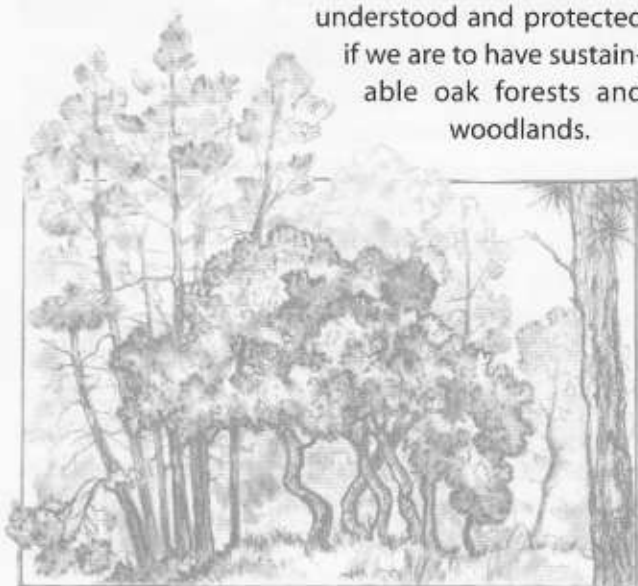
It's the Little Things

By Rich Little

Even though the Cambria forest is known for its unique pines, coast live oaks are also an important part of the forest or woodland community.

Recent studies by University of California researchers have determined that the richest biological diversity (array of different kinds of plants and animals) of any major habitat in California occurs in oak communities. This irreplaceable

heritage of biodiversity needs to be understood and protected if we are to have sustainable oak forests and woodlands.



Lynn Rathbun

There are 7 to 10 million acres of oak woodland in California. These oak, pine, and grassland associations are very old communities, with animals and plants that have co-evolved together over thousands of years. During these long periods of time, thousands of species of plants, 170 birds, 100 mammals, and 60 kinds of reptiles and amphibians have evolved in the different types of oak tree communities.

The most abundant, however, are the invertebrates or animals without backbones. As many as five thousand different "bugs" have evolved to use oak trees during their life cycles. The trees are used as hunting grounds, food, and shelter. These "oak invertebrates" use just about every part of the oak tree, including the roots, trunk, bark, branches, leaves, acorns, and even the duff or leaf litter under the tree. What is more amazing is the incredible

number of "bugs" that can be found in one acre of a typical oak community—between ten-million and 100-million.

The associations between some of these oak invertebrates and the trees can get very complicated. For example, did you ever wonder who fertilized and watered the oak trees before we arrived on the scene? Oaks produce their own fertilizer from the leaves that they shed. However, the dead leaves in the litter are of little use to the trees as a source of nutrients until they rot. The leaves must be decomposed to release their elements and minerals for use by the trees. Two of the major non-bacterial invertebrate decomposers are springtails, an insect, and mites, a spider-like critter. Both are very small, less than an eighth of an inch long.

Research indicates that one of the major environmental factors that determines the health of an oak tree is the rate at which oxygen passes from the air into the soil around the root zone. This rate of oxygen diffusion is partly determined by the air spaces in the soil. If diffusion is too low, root growth will cease. Under such conditions toxic gases and waste products from root metabolism build up in the soil and become toxic to the trees. The stress on trees caused by waste products can be significantly magnified if root diseases are present.

What does oxygen diffusion to the tree roots have to do with oak tree invertebrates? Much of the air spaces found in the soil that permit oxygen to diffuse down to the root zone are created by soil invertebrates, not only springtails and mites, but also earthworms, pillbugs, millipedes, etc.

So, for the trees' optimal health these invertebrates are vital. This is just one of the many, many ways that oaks and their associated animals have evolved together over the past thousands of years.

The next time you look at one of those oaks in your yard, think of this and the many other unseen associations—there is more to the majestic oaks in Cambria than meets the eye.

Why the Pines Fall

By Galen Rathbun

TIMBERRRRRRR!!

This should have been Cambria's motto this last winter, as storms toppled pines, followed by a rush by many residents to remove "hazardous" trees. When the sawdust had settled, I was curious about the trees that fell "naturally." In February, I did a quick survey in my corner of the forest.

I walked about a mile of streets in the Pineridge Drive area of Lodge Hill, keeping rough account of the number of standing pines I saw—about 500. With notebook in hand, I also tallied how 28 Monterey pines had recently fallen.

I was not surprised at what I found. Twenty-two pines had up-rooted (all were tall, and 10 inches or more in diameter near their base). Three had broken somewhere on the main trunk at an old wound or canker (all three were small trees). I also found three that had broken mid-trunk, with no evidence of a deformity.

What I have always suspected, and what my survey supported, is that normally you can not look at a tree and predict when it will fall. I saw at least a dozen very large trees still standing in the forest, even though they had gross wounds and deformities on their main trunks. One of these is in my front garden, not 15 feet from my house.

If individual trees can not reliably be identified as especially dangerous, then the whole forest is a hazard. Indeed, this is why many healthy trees are being cut down in a vain attempt to make the forest safe to live in.

So why are Monterey pines so susceptible to falling? There are several reasons. First, they are short-lived. A BIG tree is only about 80 years old. Secondly, most of their wood is soft, and not particularly strong. The fibers associated with old wounds and cankers, however, are much stronger. This explains why most trees do not snap at these deformities.

Most important, however, Monterey pines are not anchored by a tap root. Instead, their roots radiate out from the base of the tree like a fan. Without this pancake arrangement, the pines probably could not grow here.



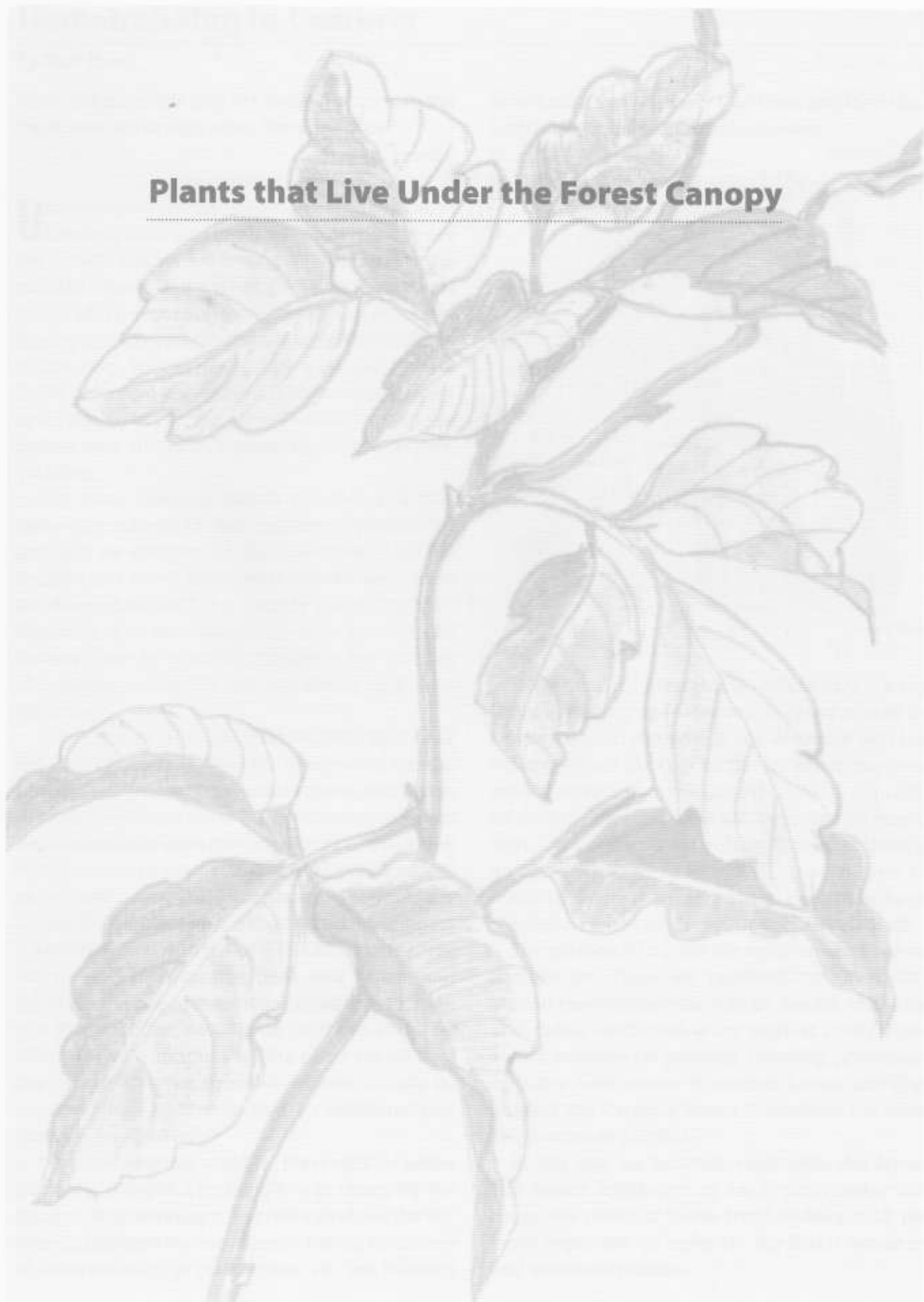
Lynn Rathbun

During our long and dry Mediterranean summers, Monterey pines can become water stressed—just like many garden plants. But our frequent summer fogs condense on pine needles and drip to the ground. The shallow pine roots are perfectly adapted to take advantage of this fog drip, which enables the trees to survive. However, because the roots are shallow, they are very susceptible to being damaged by house construction.

Isn't it arrogant and selfish of us to build houses in the forest because we love it, then turn around and cut it down because we sometimes fear it? Our Monterey pine forest is small and unique. We just do not have the moral luxury of building among the pines, then awakening to the reality of the risk and chopping them down.

So what is a Cambrian to do about all these "hazardous" pines? I make sure my car and house insurance is in order, and enjoy living in the forest for the 360 days when it is paradise. If you can't live this way, then I think you and I (and architects, builders, and realtors) have an obligation to the forest community, which includes the pines and our neighbors, to find a house that better fits our tolerance for risk. Maybe this will be outside the forest, where there are no shallow-rooted Monterey pines to worry about and cut down.

Plants that Live Under the Forest Canopy



The Mycorrhizal Connection for Life

By David H. Adams

What on Earth are fungi good for? It seems we can't live with them (plant and animal diseases, allergies, etc.) and certainly, we can't live without them. Let me explain.

Mycorrhizae are a small group of fungi that, without most people knowing it, are very dear to us. For if we were to somehow magically eliminate this group with the wave of a wand, we would soon see all of our pines and oaks dying, as well as most other higher plant life the world over.

The name mycorrhizae means fungus roots. Only a mere handful of the more than 100,000 species of fungi can serve as mycorrhizae. They are definitely some of the "good guys" of the fungus world.

You may notice mushrooms poking up from the forest floor in the fall after rains. Many will arise from mycorrhizal fungi attached to roots of Monterey pine and the coast live oak. The beautiful, but toxic, red and white-flecked mushroom *Amanita muscaria* is a common mycorrhizal associate of Monterey pine. Some mycorrhizal fungi produce mushrooms that are highly desired for the table. There is concern that certain of these edible mycorrhizal fungi may become rare due to extensive harvesting by people. Rodents, such as our western gray squirrel, also eat mushrooms, but they help spread the fungi.

The fungus-root relationship is an old one, in which both plants and fungi have evolved to become dependent upon each other. The fossil record tells us that plants became mycorrhizal soon after they left the seas, some 350 million years ago.

Plant roots are unable by themselves to take up sufficient minerals and water from the soil; mycorrhizae fulfill that role. Plants on the other hand keep their mycorrhizal fungi supplied with carbohydrates manufactured in their leaves. Together, the plant and fungus have a "mutualistic" relationship, one in which each contributes to the well-being of the other for their mutual benefit.

The Monterey pine makes it very clear to its fungal partner that it is in charge. When soil water is depleted, as so often happens in late summer in Cambria, most root tips with their mycorrhizae dry up and die. This is normal for the long, dry summers

of our Mediterranean climate. The "resting" tree then doesn't have to expend its carbohydrate and water reserves to support the fungus during the summer. And this is no problem for the fungus, because it simply recolonizes new root tips when they are regenerated after fall rains moisten the soil.

By now it should be quite clear that mycorrhizae are important, indeed vital, for tree health. But with the domestication of Monterey pines and coast live oaks around homes, soil compaction and over-watering become significant killers of these fragile fungi.

For continued health of the forest, it is extremely important that the unseen mycorrhizal connection be respected for the role it plays in tree health and be protected, as much as possible, from disturbance.



Fly Agaric, *Amanita muscaria* (x 1)

Lynn Rathbun

"It's a Good Grass Year"

By Jeff Kwasny

An expression that I hear often lately, "it's a good grass year," has a profound difference in meaning and value, depending on which side of the fence you're standing on. To those of us living in the forest it means a high fire danger. To the cattle rancher the abundant grass equates to fatter and healthier cattle, less soil erosion, and the outlook for the same next year because of the high seed cast.

To the sightseer, the tall grasses blowing in the wind depict waves traveling across the hillsides; "grass waves" my son Nik calls them. To those who suffer from allergies, a good grass year results in hay fever. Come this summer, tourists will flock to California to see the "Golden State," a description started by a clever Chamber of Commerce office describing the cured grasses on our hillsides. To all, cured grasses mean "stickers," such as foxtail seeds in our socks—nature's clever way of transporting seeds.

There is a definite edge where the forest vegetation meets the foothill grasslands. On the outside, the foothills are predominantly annuals (those that live only one growing season). Within the forest you may notice that some grasses stay green through spring and late summer. These are the perennials (those that live two or more years). It is these perennials that we generally refer to as the "native grasses," those that occurred here before European man arrived.

Great changes in the grass species began to occur during the Spanish Mission period of 1769-1824. Annual grasses, native to the Mediterranean region of Europe, were transported to California in feed for domestic livestock and in soil used for ballast to improve stability of ships. By their very nature, annuals are aggressive and highly competitive, capable of producing the overwhelming amounts of seed that ensure new plants the following year. In the old days, perennials had only to cast relatively few seeds to perpetuate themselves.



Lynn Rathbun

California Oatgrass,
Danthonia californica (x 1/2)

The ecology of the undisturbed forest understory favors native shrubs and perennial grasses. Here both grow thick and robust, while the annual grasses are sparse and short. Here they hold rainwater in the soil long enough for absorption and use by the trees. In return the tree canopy provides shade, the dominant influence on temperature and moisture.

Common perennial grasses found in Cambria are: needlegrass, named after the long sewing needle-shaped bristle attached to the seed; pine bluegrass, referring to its color and habitat under the pines; redtop, referring to the red tint of the seed-enclosing sheath; wild rye, a cousin to the species used in cereal and flour; California brome, a 2-3 foot tall grass, has large panicles with flattened purple seeds; and California oat-

grass, a low-spreading member of the oat tribe. The most common non-native annual grasses in the forest include little quaking grass (the seed heads quake in the wind), rattlesnake grass (the seed heads resemble a rattlesnake tail), and wild oats.

Today, even though there is a strong movement to maintain our native flora, the introduced annual grasses are here for good. Public land management agencies have developed plans to re-establish natives, and cattle ranchers are developing grazing schemes that favor perennials.

Here in Cambria, if you would like to help perpetuate the natives, the next time you're out weed-whipping those cured "Golden State" grasses, notice those that are still green, or have a bunch of green foliage at their base. Skip over these native perennials, and give them a little help competing with all the non-native annuals.

Cut Your Weeds . . . But Save the Trees!

By Robert Farino

Spring is the time for weed-abatement in Cambria. This sometimes controversial program is intended to provide a balance between fire safety and the preservation of the forest we live in.

Along with the ambiance and beauty of living in Cambria comes the ever-present danger of a wild-fire. Cambria's native Monterey pine forest is a mature stand that has been stressed by drought, insects, diseases, and urban development. The Monterey pine is also a shallow-rooted tree that is highly susceptible to windfall.

The result, from a firefighting perspective, is a dangerous combination of both standing and fallen dead trees, fire-prone brush, an annual crop of grasses, homes built on steep slopes overlooking fuel-covered canyons, and narrow, winding roads. Just add a dash of high temperatures and a pinch of dry, offshore winds, and you've got a complete recipe for a major conflagration.

The goal of Cambria Fire Department's weed-abatement program is to reduce the fire hazard, enabling us to extinguish fires while they are still small. Being a small, isolated community, Cambria has only three full-time firefighters and its volunteers. Beyond our initial response equipment and personnel, which includes California Department of Forestry and Fire Protection/County Fire crew, it can be 20 to 30 minutes before additional fire engines and crews arrive. Therefore, the first 30 minutes of a fire are crucial for us, and proper clearance of wildland fuels around homes is intended to buy firefighters enough time to make a stand before the fire gets into the tree tops or houses.

The weed-abatement program includes vacant parcels adjacent to or between homes within the Cambria Community Services District. Some of these parcels need to be cleared edge-to-edge, while others only need a "fire-break" of 25 feet alongside the adjacent structure. The Cambria Fire Chief makes this determination based on the degree of existing hazard and anticipated fire behavior in the area. Weeds must be cut down to at least 4 inches, and larger fuels (dead trees and branches) that have accumulated on the ground must be removed. This not only reduces the fire



Art Van Rhyn

hazard, but also allows firefighters to pull hoses completely around homes without snagging the hoses or injuring themselves.

We receive many comments from Cambria residents concerned about when neighboring lots will finally be cut, or that we are not doing enough to reduce the fire hazard around their homes. Others feel that we are too aggressive with the program, and disturbing the natural ecosystem. In order to address these concerns, we strongly encourage all those who perform weed-abatement to protect the young trees. We have orange flags available at the fire station (courtesy of Blackburn Mfg.) that can be used to identify the seedlings; leaving a circle of weeds around them is perfectly acceptable. We also encourage people to spare the native understory, such as toyon, coffeeberry, monkey flower, gooseberry, currants, ferns and coast live oaks.

Although it is a delicate balance, we feel that it is possible to provide an acceptable level of fire safety while still preserving the natural qualities of the forest that we call home.

New Exotics, Old Problems The Displacement of Native Species

By Greg Smith

From marine invertebrates to avian marauders and from annual grasses to perennial trees, non-native exotic pests are displacing the original resources of the central California coast. One of my jobs as a resource ecologist at San Simeon State Park is to restore native habitats by controlling and removing invasive plants.

Non-native plants such as broom (*Genista monspessulana*) from the Mediterranean, blue gum (*Eucalyptus globulus*) from Australia, cape ivy (*Delarea odorata*) (a.k.a. German Ivy – *Senecio mikanioides*) from southern Africa, and pampas grass (*Cortaderia jubata*) from South America all have one shared growing requirement: disturbed soil. These plants are primarily found in areas where the soil is disturbed on a continuous basis. Eucalyptus, broom, and pampas grass are found growing along road shoulders where sloughed material creates new opportunities for germination. Cape ivy and eucalyptus are found in creek or riparian zones where floods inundate areas with new soils. In the Monterey pine forest of Cambria all the species are found associated with house construction and road maintenance.

Some exotic plants become naturalized (a word of caution: "naturalized" does *not* mean "native") in local habitats, so that they no longer need disturbed soils to germinate. They are able to outcompete our native plants, thus forming monocultures that choke out everything else. Extreme examples of monocultures can be seen on coastal bluffs in our area, where ice plant (*Carpobrotus edulis*) from southern African forms solid carpets, or on the dunes north of Morro Rock where European beachgrass (*Ammophila arenaria*) runs rampant. In Cambria, the trees that grow between Santa Rosa Creek and Windsor Road are enveloped by cape ivy.

Some non-native plants are capable of developing monocultures by way of their prolific seed production and growth. Others, such as eucalyptus and myoporum (*Myoporum laetum*) from New Zealand essentially transmit chemicals to the soil in areas where they grow that prevents other plants from germinating.

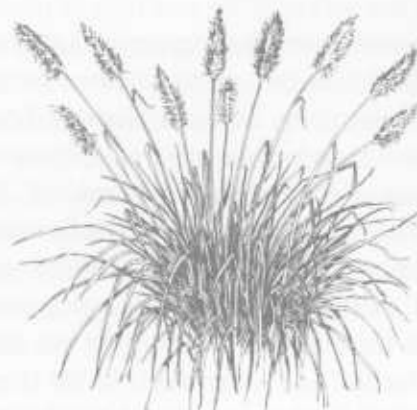
This insidious impact to our plant communities has far reaching implications. The loss of native

plants has a direct effect on the native wildlife that would normally inhabit these communities. When native species reach the point of extirpation, they may be listed under the Federal or State endangered species acts, which then affects how planning decisions are made in our communities and for our agricultural parcels.

Within San Simeon State Park I remove eucalyptus and pampas grass seedlings by hand or spray them with a herbicide to prevent their expansion. We have successfully eradicated pampas grass from within the park by using these methods.

The size (in acreage) of the cape ivy problem in the park and in the Cambria area has grown to the extent that its manual and chemical removal is not possible from an economic or logistic perspective. This brings biological control to the forefront when trying to assess methods for control and removal of these exotic species. Research is being undertaken in South Africa to determine if a biological control is available to help eradicate cape ivy, or at a minimum prevent its further spread.

Other non-native naturalized plants that are displacing native species in our forest include periwinkle (*Vinca rosea*) from Europe, giant reed (*Arundo donax*) from Europe, fennel (*Foeniculum vulgare*) from the Mediterranean, garden nasturtium (*Tropaeolum majus*) from South America, Italian thistle (*Carduus pycnocephalus*) from the Mediterranean, milk thistle (*Silybum marianum*) from the Mediterranean, iris (*Chasmanthe floribunda*) from southern Africa, and several annual grasses from the Mediterranean.



Seven foot high Pampas Grass

Lynn Rathbun

The Virtues of Poison Oak

By Linda Warren Seek

Poison oak has a long history of association with man. Native Americans used its juice as a wart cure, to treat ringworm, and as a black dye in basket making. They used the fresh leaves as a cure for snakebite and also put them in their acorn meal.

Full-blooded Native Americans are not affected by poison oak, but many other people do react to the plant with a red, itching rash that lasts for about a week. This reaction is caused by the oil that is found in the sap and other parts of the plant, including the pollen. Even smoke may carry the oil through the air. Animals and clothing that have touched poison oak can also transmit the oil.

For all of its bad reputation, poison oak does have many redeeming values. As all plants do, it provides oxygen to the atmosphere, helps prevent soil erosion, and is an important part of the food chain.

The poison oak growing in our Monterey pine forest is a source of food for many of our native animals. Each fall the plant produces berry-like fruits that attract birds, such as the northern flicker, a species of woodpecker. I enjoy watching the flickers trying to balance their relatively large bodies on the small branches of poison oak bushes in order to eat the fruits. Northern flickers feed mostly on insects, especially ants, and supplement this diet with seeds and berries.

Many birds use the dense poison oak bushes for cover. Deer browse on the leaves and monarch butterflies visit the plant for nectar or pollen.

The main fall color in our pine forest is provided by poison oak. The leaves turn yellow or bright red then drop off. The remaining naked branches are the sources of many cases of dermatitis because poison oak is difficult to recognize without its leaves.

Most people are familiar with the saying "leaves of three, let it be." This is an easy way to remember that poison oak has three leaflets that are slightly lobed, similar in shape to the leaf of the valley oak tree. Each set of leaflets is attached to a branch in an opposite pattern. The small greenish flowers grow in clusters that turn to globe-shaped, yellowish berry-like fruits that are the size of pepper corns.

If you "get" poison oak, it takes two or three days to develop the rash after you have contacted the plant oil. There are several ways to avoid trouble. First of all, know what the plant looks like in all seasons and avoid touching it. Also avoid contact with pets that may have been playing in poison oak. If you know you are going to be in poison oak, or know that you already have been in it, there are preventative lotions available that really do work. Check with your pharmacist.

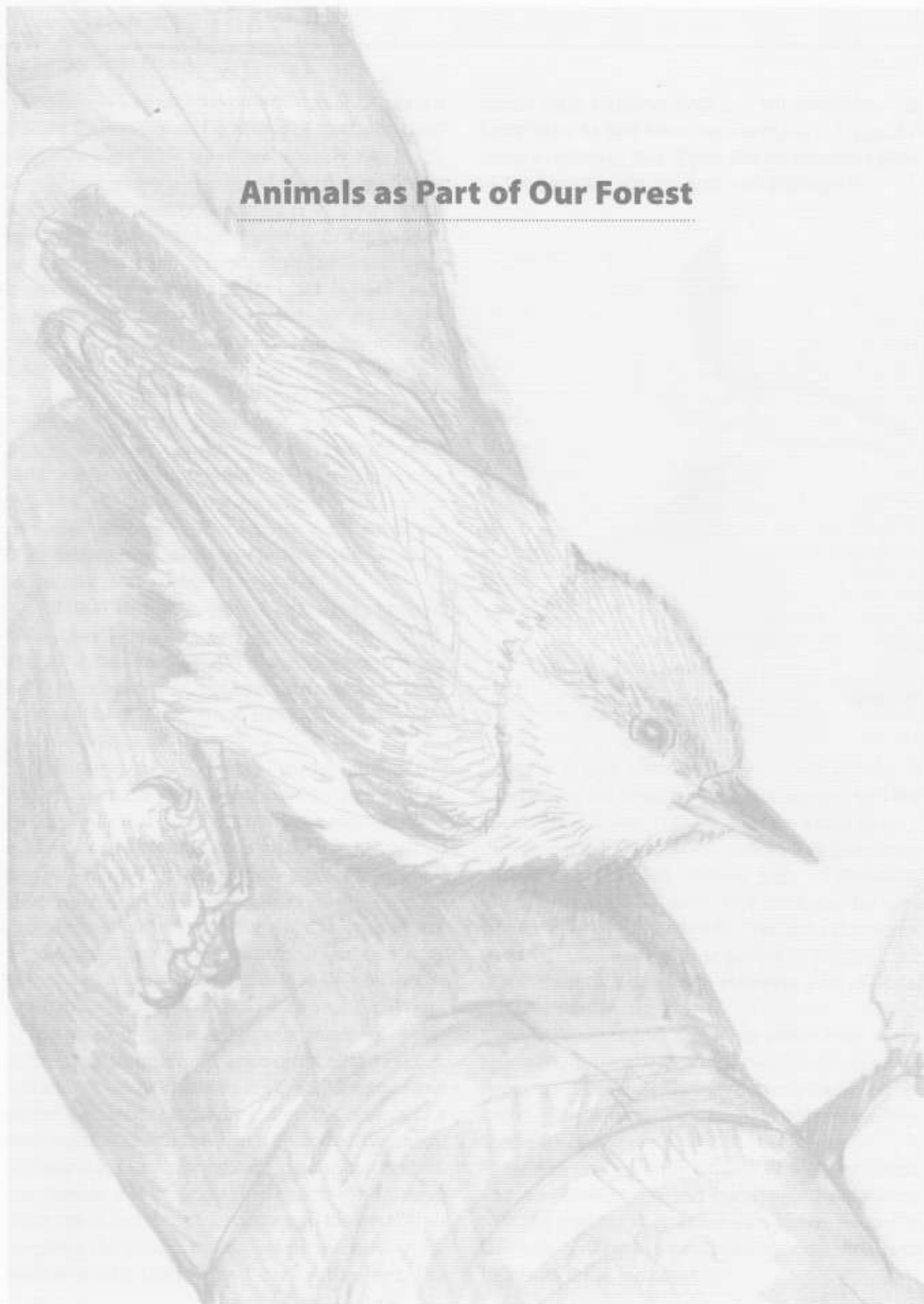
As a drought tolerant plant, poison oak is ideal. Being native to our Monterey pine forest it needs no special care. In fact, in most areas it will come up on its own. In my yard I have trained it up my back fence with a once-a-year pruning when it is without leaves. In my front yard it also grows on a fence and the deer prune it for me. It provides a dense green visual barrier in the spring, attracts birds and butterflies in the summer, and provides a display of bright colors in late summer and fall.

So, think twice before you attack that poison oak in your yard. It is doing much more than potentially making you itch.



Art Van Rhyn

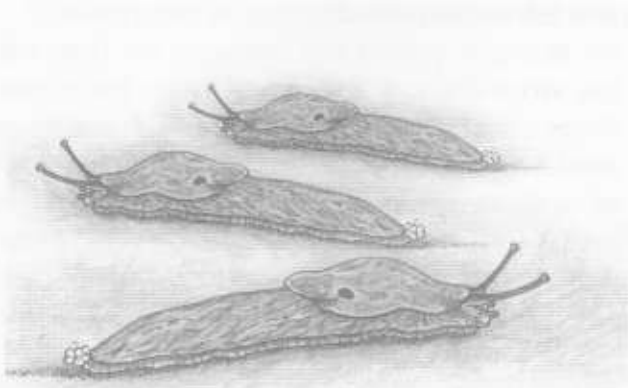
Animals as Part of Our Forest



Creepy Critter

By Aryan Roest

The Monterey pine forest of Cambria supports many animals that are usually referred to as wildlife—mammals, birds, reptiles, and amphibians. In addition to these vertebrate animals the forest also provides food, cover, and dwelling places for animals *without* backbones—the invertebrates. They include centipedes, millipedes, pillbugs and sowbugs, scorpions, spiders, worms, and many, many kinds of insects (flies, mosquitoes, ants, termites, etc.). Among the more obvious invertebrates are the large banana slugs, so called because they are sometimes yellow and about the size of a small banana.



Lynn Rathbun

Slugs along the Pacific Coast may be yellow, very dark, have distinct spots, or may even appear almost white. The Columbian banana slug (it was first studied near the mouth of the Columbia River) is larger than most other slugs, reaching a length of six to eight inches, or rarely even ten inches, and may be almost an inch in diameter. Our local banana slugs (*Ariolimax columbianus*) are olive or tan in color, without spots. The color may vary, however, depending on conditions of light, moisture, age, or health of the animal. To our north, near Santa Cruz and the mountains of the San Francisco Peninsula, another form of banana slug is found that may be bright yellow in color, and looks even more like a banana than does our local form.

Our slugs have a single foot on their underside which has short vertical stripes around its edge. They can see (not clearly) with tiny eyes at the ends

of two longish tentacles at the front end, and detect odors with two short tentacles below the eye stalks. They breathe through a single opening at the side of the mantle, which is a thickened area on the back, behind the tentacles. Mouth and anus are at the front and back ends of the body, respectively.

Banana slugs are restricted to moist, shaded conditions, such as those provided by the forest in Cambria. They are very sensitive to dehydration, and are rarely active in situations with an abundance of warm sunshine. During the day, they retreat to slug-selected hidey holes, from which they emerge at night or on overcast days when humidity is higher.

Slugs are an important element in the ecology of our local forest. These creeping creatures feed on live or dead vegetation on the forest floor, and may also eat dead animals when encountered. They appear to be particularly fond of mushrooms. Banana slugs may eat garden plants if they come into a garden situation, but are not usually a problem for cultivated plants.

Please do not put out snail bait for these decomposer organisms that help keep our forest functioning as it should. Most other snails and slugs that attack our garden plants are not native, but have been introduced accidentally from elsewhere.

Range maps indicate that banana slugs occur in coastal central California from Monterey to Morro Bay, but I have not personally observed them in much of this region. It would be interesting to learn just where they occur locally. For example, the last one I saw was coming out from under the mess hall at the YMCA camp in Cambria, last June. Most of the nearby vegetation was unmowed grass; the nearest trees were Monterey pines, about 100 feet away. The slug was sort of dark tan, without spots.

It would be interesting to learn just where banana slugs occur locally. Why don't you send me a postcard with your observations of these fascinating forest dwellers? Let me know where, when, approximate size, color, and habitat. Send the postcards to me at 1150 Calle Cordoniz, Los Osos, CA 93402. I will organize and evaluate all reports, and prepare a summary.

"To Know, Is to Know What to Look For"

By Richard Little

Pine pitch canker has received a lot of attention recently in Cambria. However, not all the dying pines in the forest are succumbing to this fungal infection.

There are many native insects associated with Monterey pine in its "native" habitat. Some of them are considered harmful as they can stunt, weaken or kill the tree. Red turpentine beetles, bark beetles, and twig beetles are examples of "harmful" insects to Monterey pines.

A stressed or weakened tree is a plant growing under less than ideal conditions, which insects are quick to take advantage of. When your Monterey pine starts to show some reddish pitch tubes on the bark at the base of the tree, you probably have red turpentine beetles. The red turpentine beetle attacks are always at the base of the tree. The pitch tubes are often described as a reddish column of frosting with a small hole in the middle. Later the collapsed tubes look like a small pile of white to reddish coarse sawdust.

Because the red turpentine beetle is one of the first insects to attack stressed or weakened pine trees, you should consider its attack as a sign that your tree is in trouble. The damage from this beetle, while appearing to be severe, usually does not kill the tree—it just further weakens it, making it more attractive to bark and twig beetles.

The adult red turpentine beetle is dark reddish-brown, and about 1/4 inch long. After boring into bark the female lays her eggs along the edge of her tunnels. The larvae create a large cavity by feeding inside these tunnels. One to several generations may be produced in a year.

If you see small, round exit holes about the size of a pencil lead in the bark of a pine tree's trunk and larger branches, your tree may have bark beetles. These insects are now considered one of the most destructive insects of Monterey pines. Bark beetles and bark engravers, which are common names used for beetles in the genus *Ips*, are 1/16 to 1/4 inch long. They are brown to black in color.

Bark engravers usually attack trees in the spring, when the weather starts to warm. The male attacks the tree first. When he is successful in boring into

the bark, he constructs a nuptial chamber. Females then enter, and construct side tunnels. Each female then lays her eggs along the walls of these tunnels.

The beetle grubs or larvae hatch from the eggs and feed on the inner bark. When they finish feeding and growing, the grubs form pupae and then transform into adult beetles. In Cambria, up to two generations are produced each year. The beetles usually over-winter as adults, but sometimes grubs, pupae, and even eggs can be found during winter. The primary factor that determines the abundance of beetles in the forest is the number of stressed, dying, dead, or recently removed trees and tree parts left on the ground.



California 5-spined *Ips* (x 15)

Lynn Rathbun

The Monterey pine twig beetle is another insect of concern in the pine forest. In the past, this beetle was not considered an important pine pest as it would only damage or kill branches of pine trees, not the tree itself. The beetle still does not kill trees, but it is an important vector or carrier of pitch canker, which as we all know, is going to kill a large part of our forest.

Twig beetles are dark brownish in color and are 1/16 inch long. They make their egg galleries in the inner bark of smaller, lower crown branches. In Cambria, they can have one or sometimes two generations per year.

If you see a Monterey pine with yellowing needles, you should now be able to closely examine the bark and determine which of these three beetles might be causing the problem.

A Very Large Beetle

By Kellen Trimble

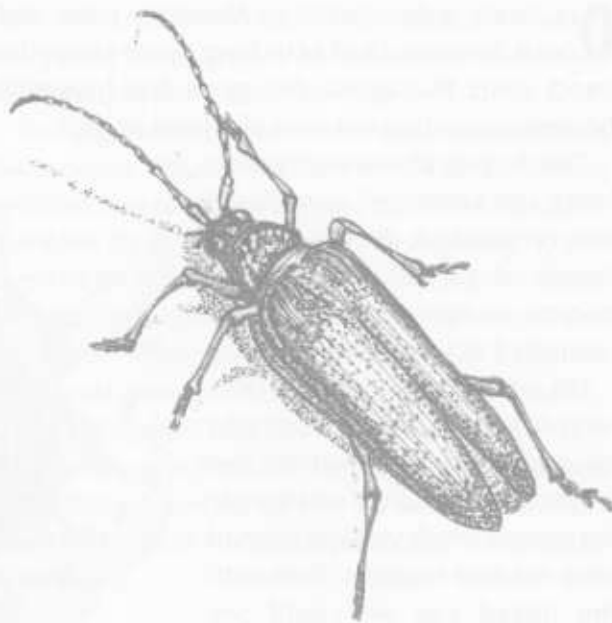
Walking along the sidewalk on a bleak Tuesday morning, I found myself leaping a foot upwards as a shriek cut the icy air like a knife. Moving as quickly as I could, I discovered what had occurred: a spined wood borer (*Ergates spiculatus*) was skittering clumsily across the pavement while searching for a mate. Frightening herself as well as the beetle, stood a screaming tourist as wrinkled as the unpressed saffron colored dress she wore. Sighing out loud, my shoulders sagged as I approached the scene, and attempted to explain to her about the beetle.

Many people probably have experienced scenarios such as this one, where they have been frightened by this exceedingly large beetle, especially at this time of year. This dark brown, 2 1/2 inch long beetle sports antennae almost as long as its body. It also has intimidating mandibles, and uniquely patterned wing covers. It is found only in and near forest and woodland areas.

This member of the long horn beetle family needs a source of wood to survive and reproduce. Generally associated with pine trees, it also attacks oaks and redwoods. They have also been known to assault telephone poles. Many people fail to realize the good this beetle does. It helps to produce shelter for mammals and birds and also aids in the decomposition of dead trees.

Due to their large size, these beetles can produce fear in some people. Their bite can be painful if you're not careful when you pick them up. However, their mandibles are mostly used for gnawing through wood, in which they deposit their eggs. After 4 to 5 months the eggs hatch into 2 1/2 inch long grubs or larvae, which eventually metamorphose into adult beetles. The adults finally emerge during the summer and leave the tree after a 16-18 month period to find a mate, after which they die.

The spined wood borer tends to be attacked by parasites (such as mites) but they are soon eaten by miniature arachnids called pseudoscorpions. Hiding under the elytra or leathery front wing covers of the beetle, these 1/10th of an inch long creatures maintain a symbiotic relationship with the beetle until its death.



Spined Wood Borer (actual size)

Lynn Rathbun

However, not even its large mandibles can save the beetle from its greatest predator: man. When trees are sprayed with chemicals to try and control bark beetles, the wood borers are also killed outright. Another problem occurs when dead trees are removed for fire prevention causing the beetles to lose their main source of food and shelter.

Many borers are also killed out of spite or because people believe they are attempting to attack them, even though these beetles do not harm humans. Often the beetle is thought of as a pest and is destroyed because people believe it is burrowing into their homes, when it is probably just attracted to their porch light. However, not even all these assaults will end up stopping the spined wood borer's relentless drive for survival.

Oak Tree Hoppers

By Brad Seek

Our forest is dominated by Monterey pines and coast live oaks. Most of us have heard about the insect pests that attack our pines, but I recently became aware that our oaks also have pests.

One August afternoon, my wife, Linda, and I observed a small, wet area on our deck, directly below a branch of a coast live oak. Our training as agricultural inspectors compelled us to have a closer look.

On a twig we found the creatures that were leaving that tacky syrup now under our feet. We saw a tight aggregation of small, sucking insects, which we later learned were oak tree hoppers. Even with the naked eye we could see that they were brightly colored with red, white, and black stripes. Each one was roughly shaped like an under-inflated football. To me, they looked like tiny African masks.

This wasn't an infestation. It was the only group of its kind on the entire oak. There were 25-30 of these immature insects (nymphs) that had uniformly entered into their fourth stage of development (instar). They were more than half way to maturity.

I pulled down my camera equipment and tried various lens combinations until I came up with an acceptable magnification. When I panned the camera to one end of the group I was surprised by the presence of a different insect. It was much larger and blended very well with the color and shape of the oak tree branch. Even with my camera lens two inches away, it remained motionless but watchful. This was the progenitor, the vigilant parent, that was patiently watching over its brood.

When a nymph would stray from the cluster, the parent would slowly and gently herd it back into place. Whenever a foreign insect approached, the parent rapidly and audibly fanned its wings as it moved towards the intruder.

In a few days the nymphs changed into the final instar. Like a jumpsuit succumbing to middle-age spread, a white line appeared along the back of one nymph. It grew wider, and soon a white, ghostly creature with red eyes pushed out of the old covering. This almost pure white stage was short-lived. As the outer skin hardened, it began to darken. Within a few hours the young tree hopper resembled its siblings, but with a slightly different shape. Moulting of the others followed quickly. In several days the nymphs were all shaped like the adult. They were predominantly white with red/yellow stripes and fiery red eyes.

Their color change was gradual, and it led me into a false sense that there was plenty of time to record a last transformation. But their biological clocks were set. Instead of watching them disappear through camouflage, I watched them take flight as young adults. Soon there was nothing left but the needle marks on the twig, where they had fed on oak juices.

Even though this appeared to be a project that suddenly lost its funding, I was stimulated to do some reading about tree hoppers. It takes about two months from egg laying to dispersal. This cycle is repeated twice a year. The adults live a solitary existence, except for mating and caring for the young. Aggregations are found with and without parental care, and as you might expect, the young have a better survival rate when an adult is present.

Tree hoppers have a lot of natural predators, and this may explain why I never found them in abundance. It will be interesting to see how they fare after living through an El Niño season.

Although these sucking insects feed on the oaks, they seem to be a relatively benign pest, causing no long-term damage that we are aware of.



Lynn Rathbun

Trials and Tribulations of a Frog

By Julie J. Eliason

If you were asked to name the wildlife residents of our Monterey pine forest, would you name the California red-legged frog? If so, you would be correct, because it resides in Santa Rosa Creek, which winds through Cambria.

The red-legged frog is large, measuring about 3-6 inches, and is brown or reddish-brown in color with dark spots. It gets its name from its hind legs, which are often salmon-tinged on the insides. But sometimes the color is faint or absent.

The life of a red-legged frog is not an easy one. Everyday, it must evade predators such as egrets, owls, hawks, and raccoons, which attempt to include it in their daily menus. However, the red-legged frog has adapted to this hunting pressure by using the vibrations transmitted along the willow branches it rests on to detect the approach of predators—and make a speedy exit into a deep pool.

The frog must also face raging creek waters during the winter months. During this time, adults are not easily seen along our creek. Biologists have found frogs high on the banks, burrowed beneath the leaf litter to escape the flood waters. Summer-time poses other problems for the frog when creeks dry up and the deep pools, which it needs for escaping predators and for breeding, disappear. Luckily, red-legged frogs can move relatively long distances across forests and pastures to other sources of water.

In the late winter or early spring, adult male frogs begin to form small groups of 3-7 individuals in breeding pools, and with their low calls they attract females. Although the female is slightly larger than the male, he is able to grasp her with his thumb pads while they mate. Soon, the mated female attaches a gelatinous mass of 2,000-6,000 eggs to the emerging stem of an aquatic plant. One or two weeks later, the eggs hatch into tiny tadpoles.

The life of a tadpole is even tougher than the life of an adult frog. Tadpoles must conceal themselves in aquatic vegetation from many voracious predators such as fish, snakes, and frogs. After 4-5 months they gradually undergo metamorphosis, and change into young frogs. The algae diet of the tadpole then switches to one of insects, snails, worms,

tadpoles, and even other frogs. Within 2-3 years, the young frogs grow into adulthood and begin the breeding process all over again.

Red-legged frogs were once more numerous in lower Santa Rosa Creek, but their numbers have declined due to loss of habitat. Our creek has been trampled by cattle, channeled by Highway 1, and diverted for human water needs. Upstream erosion has also filled creek pools with sediments, and the creek-side vegetation, needed by the frogs for shade and cover, has been removed in some areas.

The red-legged frog has disappeared from much of its range, which recently resulted in its listing as a threatened species by the US Fish and Wildlife Service. Hopefully, this legal protection will assist in its recovery.



Lynn Rathbun

Some biologists believe that amphibians are good indicators of the state of the environment because of their sensitivity to environmental changes. Therefore, it is important to monitor amphibian populations to detect changes in the environment that could eventually have a negative impact on the human population.

An Irruption of Birds

By Greg Smith

Irruption is probably the most conventional term used to describe the unorthodox movement of large numbers of birds beyond their normal winter range. The primary reason for this phenomenon is an inadequate food supply within the species' wintering grounds. Another term used to describe the irruption of a particular species is "flight year."

Most irruptive species can be classified in one of two groups: seed-eating mountain residents (i.e. evening grosbeaks, red crossbills and red-breasted nuthatches), which are dependent on coniferous trees for their seed source, and birds of prey (i.e. hawks, owls and kites), which are dependent upon rodent, reptile and insect prey. The Cambria Monterey pine forest provides winter nourishment for the irruptive montane seed eaters, which are the subject of this article.

Most irruptive species share a common characteristic: they have a somewhat restricted food source that can be severely affected by significant changes in weather. This food supply is usually irregular in abundance and when poor years occur, birds dependent on that particular resource irrupt to find new or additional sources of food.

The majority of individuals within these groups of irruptive seedeaters are adolescent birds. It is well known that range expansions and unusual breeding locations are the result of young birds wandering farther afield than adult birds. When large scale irruptions occur, it is not unusual to have a small number of individuals remain and breed in areas that wouldn't normally be considered home.

This past winter large numbers of red-breasted nuthatches were in Cambria, while evening grosbeaks and red crossbills were also present in smaller numbers. The attraction to our area was the seeds found within the cones of our pines. But wait! The Monterey pine is a "closed cone" pine that needs fire or an extremely hot day to open its cones and release seeds. Neither of these phenomena came to pass this last winter, so how were these species able to find seeds?

Red-breasted nuthatches are short, compact birds with a sharp, narrow bill. They can be seen moving down a tree trunk head first, probing into

bark crevices looking for insects and spiders. Their short legs and long, curved claws allow them to hold tightly to bark or pine cones as they forage in this unusual manner.

It is the outer scales of the pine cone that have opened up during the heat of summer that the nuthatch investigates with its sharp bill. It probes the inner reaches of the cone for seeds that haven't dropped to the ground.

Red crossbills are unique in the bird world for their scissor-shaped bills. The remarkably elongated and crossed mandibles are ideal for probing the inside of open pine cones for seeds. It is not unusual to see a flock of crossbills hanging upside down, each individual on its own cone trying to extract a seed. A red crossbill's uniquely adapted bill allows it another way to extract seeds from the closed cone of the Monterey pine. They are able to pry open the closed scales of both green and ripe pine cones, thereby utilizing a food source that is usually only available to gray squirrels.



Black-headed Grosbeaks

Judy Lyon

Evening grosbeaks have truly large beaks compared to their body and head size. Their cone-shaped bills are of sufficient size and strength to open green pine cones and remove the seeds. One problem with such a massive bill is dexterity. Often the grosbeak will be able to open the cone, but the seed falls to the ground prior to being eaten. Fortunately, the evening grosbeak is not hesitant about feeding on the forest floor, and it is there you will find small flocks foraging for this season's fallen seeds.

Next winter if you hear the rapid kip-kip-kip of the crossbill, the ank-ank-ank of the nuthatch, or you see a flock of robin-sized yellow, black and white birds perched in the top of a Monterey pine, you'll know that an irruption in the pines is taking place.

Woodpeckers in the Pines

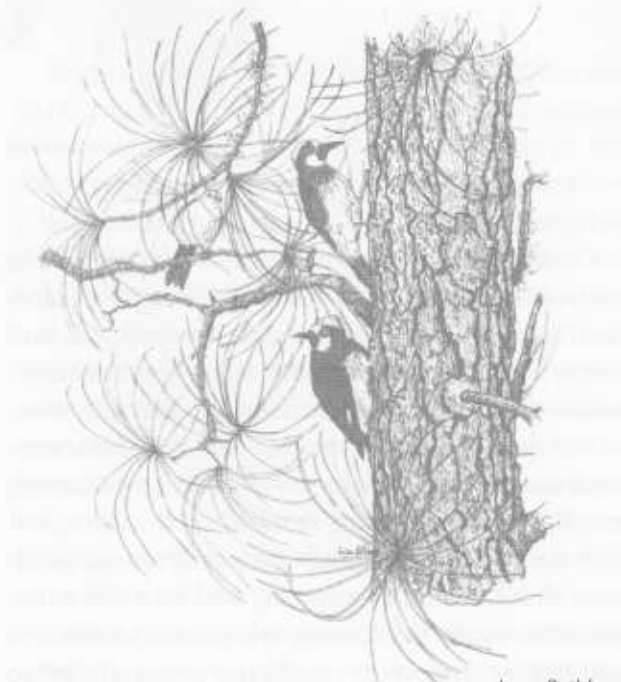
By Lynn Rathbun

Wekka-wekka-wekka. The sound carries with insistence across the pine forest to our back deck. I have heard it before, while walking my dogs down the unpaved back streets of Lodge Hill near the Fiscalini ranch.

I am not surprised to catch the swift, undulating flight of woodpeckers out of the corner of my eye. They fly with a certain steadiness and determination from the pine snag located about 150 feet away to the trunk of a large Monterey pine next to our house. The calls come again, then much chattering, as one bird after another falls in line up the trunk of the pine tree.

It doesn't take an ornithologist to figure out that the birds are impatient and hungry. I look at my watch and realize that four o'clock has come and gone and the feeder is empty. So I spread a handful of seed in the wooden tray as their comical black and white faces peer down at me. They continue to scold: "wekka-wekka-wekka." As soon as I retreat indoors, the birds descend from their vertical perch and line up single file at the feeder.

Woodpeckers tend to be solitary or paired. But not this one. Last year I counted as many as sixteen individuals in our flock, but today there are only 10.



Lynn Rathbun

So what kind of woodpeckers are these noisy clowns that form such large groups?

They are acorn woodpeckers. The name comes from their fondness for acorns, which they store in holes drilled in dead pines or oaks. In the absence of acorns they will substitute pine nuts or even sunflower seeds. The snag behind our house is dotted with many hundreds of holes containing these seeds. Storage trees like this (sometimes including telephone poles) are called "granaries," and are fiercely defended against neighboring flocks and even other species of birds.

Acorn woodpeckers are unique because each group comprises mostly relatives that communally store food, defend granaries and breed. Several males mate with one or two of the most dominant females. All eggs are laid at the same time in a single nest cavity in a large pine or oak. All the birds in the family help raise the young. Groups may grow as large as 16, but the optimal size for successfully raising young is 7-8.

Our acorn woodpeckers regard the seed tray as their personal property. The first sign of any bird or squirrel attempting to feed brings group members in from the granary tree to chase the intruder away.

An acorn woodpecker convinces another bird to leave by raising the red feathers on the top of its head, lowering and thrusting its head forward, then spreading its black wings so the white "windows" become visible. If this threat is unsuccessful, it will then rush the interloper and stab it with its bill.

Western gray squirrels, which are several times larger than acorn woodpeckers, usually ignore threats and attacks, so the woodpeckers resort to dive-bombing. This tactic would be effective, except for the persistence of the squirrels. They use their tails in umbrella-like fashion to protect their heads from such aerial assaults.

Acorn woodpeckers depend on our Monterey pine forest. The living trees produce acorns and pine nuts, while the dead trees provide nesting sites and granaries. The antics, displays, and cooperative behavior of the woodpeckers remind me of those of some of my fellow Cambrians, whose dependence on the forest is different, but equally strong.

Nuthatches

By Brad Seek

A couple of summers ago I had the rare opportunity to photograph and observe the comings and goings of a pygmy nuthatch family. This very small blue-gray bird is characteristic of pine forests in the West.

When the nuthatches first caught my attention, both mother and father were gleaning insects from the branches of nearby pines, oaks, and toyons, and faithfully bringing their catch back to their nest cavity.

The cavity looked like an abandoned woodpecker hole, about fifteen feet up a dead Monterey pine tree. The hole was conveniently placed so that the adults would first land on a nearby branch, then jump onto the trunk before entering the nest hole. Their long curved claws enabled them to cling easily in any position, even upside down. An adult would disappear into the nest with its catch, then exit in less than a minute. Periodically, it would leave holding a roundish object, which I later found out was a chick's fecal sac.

Although the feeding activity was fairly brisk, the parents would occasionally pause for 15 minutes, possibly to feed themselves or just to take a rest. All in all, their 12 hour schedule was quite an accomplishment for a bird that is only 4 1/2 inches long.

As if feeding were not enough, the parents would actively protect the space around their pine tree snag. Any bird flying or loitering within that invisible perimeter was met with a constant barrage of scolding: "beep- beep-beep-beep..." The intruder was followed and harassed until it left the area.

Three weeks passed before I returned to the snag one late afternoon. The adults were no longer bringing the constant flow of live food to the nest. In fact, the area appeared to be deserted... but in less than 30 minutes eight nuthatches convened with much fanfare. I heard a chorus of "beeps." Some of the birds perched on branches overhead, while others scuttled up and down the trunk. One by one they hopped into the nest hole and disappeared for the night.

When I arrived back in a couple of days the pine snag was no longer standing—it had fallen to the ground. Upon closer observation I found the rea-

son. The base of the tree had been turned to sawdust by termites.



Lynn Rathbun

Fortunately, the nuthatches were not inside when the tree fell. I learned later that these birds tend to form large flocks in late summer, fall, and winter. These flocks roost communally in nest cavities, and over 50 have been found in a single hole.

Not far from the fallen tree was another occupied snag. I observed the same bedtime gathering, and there weren't eight nuthatches this time, but well over a dozen. I walked away with some assurance that our homeless family had found another place to reside. But the experience also made me realize how important dead pine snags can be to the birds in our forest.

The Blue Jay That Isn't

By Nancy Jean Mann

A common sound in the pine forests of Cambria is the squawking and scolding of the "blue jays." While they are blue, there are actually two kinds. One is the Steller's jay—named after George Steller who first saw this beautiful bird in 1741 in the forests of Alaska while on a journey of exploration with Vitus Bering. This dark jay, with a smoky gray crest and blue stripes and jet black legs, is easily identified. The other "blue jay" in our area is the scrub jay, which has no crest and is mainly found in drier areas such as oak woodlands and chaparral.

The diet of the Steller's jay is quite eclectic: It is often said that they will "try anything once." Acorns, pine nuts, berries, and insects are the main foods eaten. Steller's jays will quickly learn to come to bird feeders, too. They are absolute suckers for unshelled peanuts. With patience and persistence birds can become very tame around people, learning to take peanuts from your hand.

Birds that are used to people sometimes become quite bold. Many campers have had their sandwiches stolen right off the picnic table by a noisy flock of jays. It's not difficult to understand why "camp robber" is a common nickname for this curious and bold bird.

And they are noisy, vocal birds. Indeed, the Steller's jay has a remarkable repertoire of over 12 recognized calls and songs. They are also excellent mimics frequently imitating perfectly the calls of red tail hawks. The only time Steller's jays are absolutely silent is around their nests. Nesting occurs from April through June in California. You'll know you're getting near a nest if you see a jay silently glide into a pine 10-15 feet above the ground.

The nest is cup-shaped and made of twigs embedded in mud and lined with pine needles. Sometimes other materials are used. I know of one pair of jays that repeatedly pulled the fur out of a sleeping dog to line their nest! Three to four greenish-blue eggs with very sparse, pale spots, are laid. The female will incubate her clutch for 16 days, while the male brings food to her on the nest. After hatching, the young will be fed by the parents for several weeks, both in and out of the nest. The

family stays together until the fall, when juvenile birds leave to find their own territories. If you discover a nest, take care. If you disturb the nest before all the eggs are laid, the birds will abandon it.



Judy Lyon

Steller's jays are tied to the pine forests of Cambria for the same reasons that many of you live here—they do not tolerate heat very well at all. If the temperature rises much above 75 degrees, they retreat into the cool shaded tops of Monterey pines. On especially warm days, birds can be seen vibrating their throats rapidly. This "gular fluttering" cools the bird in a manner similar to panting, but requires much less energy. However, a lot of water is lost in the process.

While Steller's jays get some water from moist insect food, like us, they still need to drink water everyday. Consequently, they are only found in cool moist pine forests and canyon bottoms where shade and water are available.

Steller's jays are truly citizens of the pine forest, and make charming and entertaining neighbors. Just like putting in water meters draws people to Cambria, putting in a bird bath is an excellent way to attract these birds.

Pine Cones and Tree Squirrels

By Galen Rathbun

Biological communities, such as our Monterey pine forest, include many species of plants and animals. Plants and animals as diverse as mushrooms that grow on the forest floor and acorn woodpeckers that store seeds in the tops of dead pine trees.

Most of these organisms have been living together as a community for a very long time. In fact, so long that they are perfectly able to coexist, even if one uses another as food. Let me use the relationship between our tree squirrels and pine trees as an example.

Western gray squirrels (not to be confused with California ground squirrels) are found throughout much of California in oak woodlands, where they usually feed on acorns. Here in Cambria, however, the squirrels eat a lot of Monterey pine seeds, which they harvest from the cones.



Lynn Rathbun

The pines, however, do not give up their seeds easily. The cones remain closed for most of the life of the tree, only opening when exposed to the heat of a fire or an exceptionally warm day. The rest of the time the tightly closed cone scales protect the seeds from being eaten, especially by birds. The cone scales, however, are no match for the large, gnawing incisors of squirrels. Indeed, the tree-covered roads and trails of Cambria are often lit-

tered with pine cone fragments—a sure sign that squirrels have been feeding overhead.

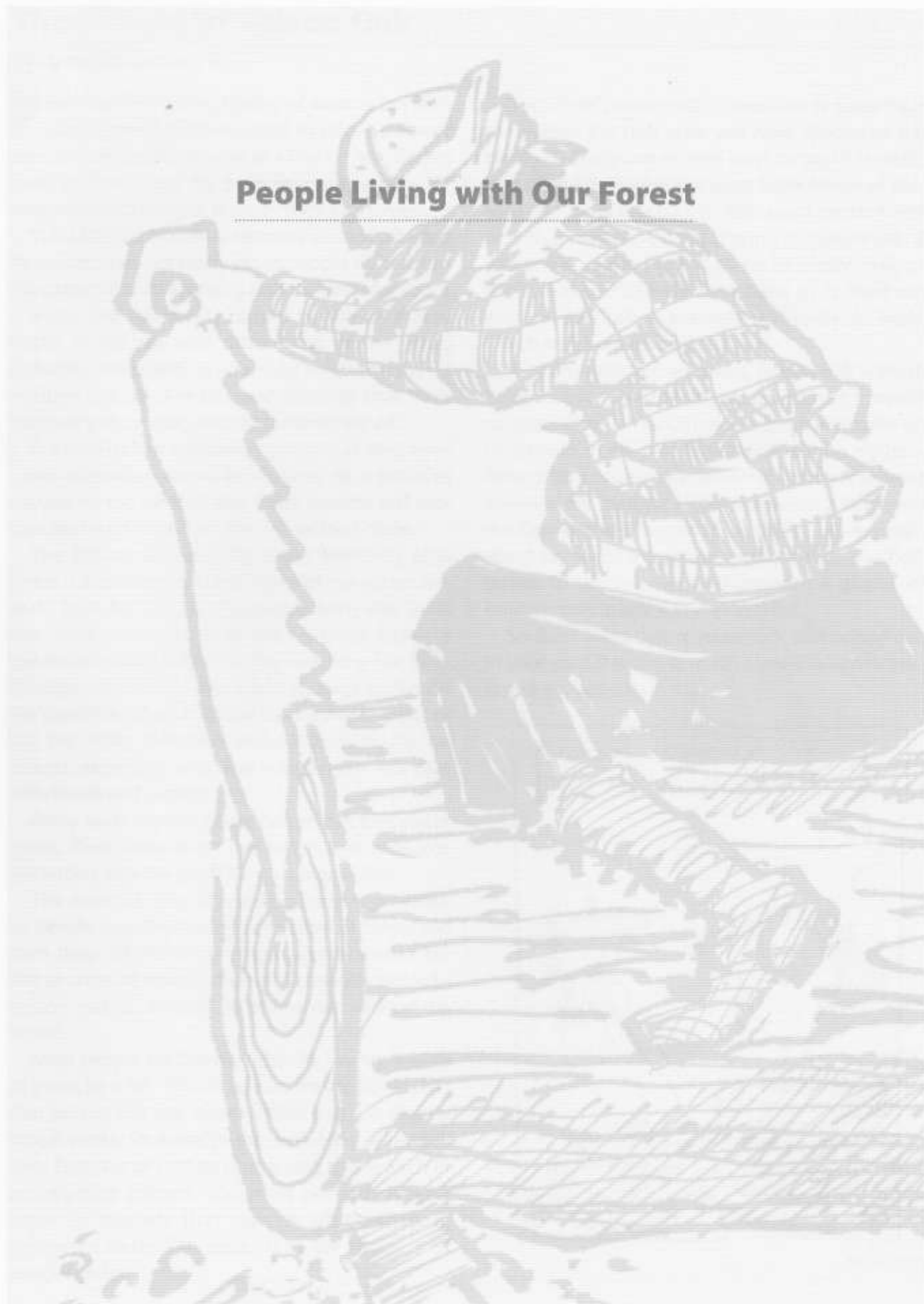
Monterey pine cones grow very unevenly. The scales at the base are larger and thicker on one side compared to the smaller and more delicate scales on the opposite side, and near the tip. Even the way cones are attached to trees is lopsided. One side of each cone lies flat against its supporting branch, with the most robust scales facing out.

I think the unsymmetrical cones of Monterey pines, and the way they are attached to branches, are a tree's way of protecting its seeds from hungry squirrels. The next time you are in our forest, take a closer look at the cones that litter the ground below the pines. Compare cones that have been gnawed with those that have not. Usually, those that are completely chewed, leaving only a core, are small in size compared with those that are unchewed. If I were a squirrel, I too would choose the smaller pine cones, which are probably more easily chewed apart to expose the nutritious seeds.

The story gets more complicated. Look at all the cones that are partially eaten. Nearly without exception the squirrels remove all the small scales, but leave the large and tough scales intact—with their seeds safely inside. The effectiveness of these tough cone scales in protecting the pine seeds is shown by another tell-tale sign. Often, there are several 1 - 2 foot long fresh branch tips scattered on the ground under pine trees, even when there is no wind to break and dislodge the branches. I have watched squirrels high in the trees chewing off these branch tips in order to expose the undersides of the lopsided cones, where the easily chewed small cone scales are located.

Although the squirrels manage to eat many of the pine seeds, the trees clearly have effective ways of protecting some of their seeds. Judging from the large number of pine seedlings in our forest, our trees seem to be producing enough seeds to ensure a pine forest for the future, and a healthy forest community that includes the western gray squirrel.

People Living with Our Forest



Painting Pines

By Lynn Rathbun

Most of us take our surroundings for granted... Once we've made the decision about where to live, which is usually tied to available jobs and the kind of work we do, our surroundings blend into the fabric of our daily lives and we don't notice them much anymore.

Many people who come to live in Cambria choose this place because of its beauty. For those of us who work in the arts, the things around us and the places we live are especially important because they provide inspiration for our work. Unusual colors, shapes, sounds and smells all stimulate the imagination, and we find them all in abundance in our Monterey pine forest.

I am a visual artist, so I feel particularly fortunate to have such a great source of ideas to draw from—no pun intended!

My studio window looks out on a small garden in the front of our house. A great coast live oak shelters ferns, a low fountain with running water, and a birdbath. The smooth branches of the oak are thick and twisted, unlike the pencil straight trunks of the Monterey pines that shoot up above the oak in search of light. Pine needles and oak leaves have been tossed by the wind over the ground like a great mixed salad, providing protection and nourishment for the roots of the trees, and cover for insects and the birds that feed on them.

Across the street in the distance, the dark trunks of mature pines punctuate the tops of straw-colored grasses and a few low shrubs. From day to day, the sky changes from blue to pale gray, and sometimes into pure white when the fog rolls in.

In front of my window, birds come and go in their daily routines of feeding, and in Spring they are busy courting, and building nests. Squirrels visit the birdbath to slake their thirst, then jump to the ground to search among the leaves for acorns and other "buried treasures."

The hues of the plants and resident birds and mammals tend to be fairly subdued. Spring and Fall are seasons of change, however, and colors seem more vibrant as vegetation changes and colorful migrant birds pass through. The air seems crisper and "fuller." Warm weather brings the heavier

scents of flowering plants and the territorial songs of courting robins and California towhees.

For me it is simply impossible to avoid all these things, to not want to draw or paint some of what I see going on around me as a record for the future. I don't want to forget it, and I want others to experience the way I feel, too.



Lynn Rathbun

The curve of a brilliant green fern frond against the rude, gray edges of the bark of a pine tree just does something to me. Likewise, the leaf litter on the forest floor is MORE than just a jumble of dead leaves and twigs: the insects and small invertebrates that live and feed among the leaves have surprising shapes and colors and they make up a subtle "ensemble" that to me equals the most sophisticated mosaic found in Pompeii.

Of course I speak only as a visual artist. A writer would tell you something different, as would someone who composes music or dances. No matter. We are all touched in different ways by our pine forest. It is just the expressions of feeling that are different. The number of people involved in the arts who live in Cambria is certainly a testament to the true value of our pine forest.

Dangerous Logging

By Forrest Warren



Art Van Rhyn

Monterey pine trees were plentiful and accessible during Cambria's early years. They were a logical choice for building materials, as some of the early cabins built in the area demonstrate. Cambria cabins were fashioned like most log houses, except that the remains of the ones I have seen had one side of the log cut to form the flat interior walls of the dwelling. The way the logs were cut indicates that

there was some type of sawmill available in the area, or that a very large amount of labor went into the hand sawing of each log. In fact, a local newspaper noted on February 29, 1868 that William Leffingwell of San Simeon owned a steam powered sawmill and grist mill. (Cambria was referred to as San Simeon at that time).

The local logging industry was only a part of the story, as a large amount of milled lumber was shipped to Cambria. The wood was unloaded from ships at three landing points in the area: the mouth of Santa Rosa Creek, Leffingwell Creek, and, of course, San Simeon. Lumber was dumped overboard and floated to shore where it was picked up and placed on wagons. Then it was hauled into town.

Unloading wood from a ship in unpredictable seas could be very dangerous due to the tides and undertows, but it doesn't seem to have been as risky as milling Monterey pine trees at the local sawmill near Cambria.

An example of the dangers of milling wood in Cambria occurred in September 1884, when the boiler of the Leffingwell mill was allowed to reach a very high pressure, which caused it to explode and kill the engineer, David Sauerhammer. The text of the newspaper article was quite graphic. The point was made very clearly that he was blown to pieces,

almost beyond recognition. Charles Bright and William Leffingwell were also injured. Bright was hurled some distance, which caused a broken rib and severe blow on the side of the head from a brick. Leffingwell received slight scratches and bruises about the face and neck when the roof of the sawmill crashed onto his head.

Another example from the *San Luis Obispo Tribune*, dated Friday, August 25, 1882, reported the following hair-raising incident:

"INSTANTLY KILLED, SHOCKING ACCIDENT AT A SAW MILL NEAR CAMBRIA

A shocking accident occurred near Cambria on Tuesday, the 15th inst., which resulted in the death of Mr. Adam C. Leffingwell, of that place. The deceased and his brother, William, were at work in a sawmill, sawing lumber, and at the time of the accident, the former was standing in front of the saw. The saw had gone through the log for the last time when, in some unaccountable manner, one of the pieces—a two inch plank—was caught by the saw and hurled forward. It struck Mr. Leffingwell on the side of the head and knocked him about fifteen feet, mashing in his skull above the ear, breaking his jaw and killing him instantly. The deceased was highly respected in the community in which he lived for his many noble qualities, and his untimely death will be felt by a large circle of friends. He was about thirty-five years of age, and leaves a widow and three children."

One must stop and wonder at all the unwritten stories that took place involving logging of Monterey pines during the early days in Cambria. When one looks at an older house in the East Village, remembering the blood, sweat, and tears that went into each board, it becomes quite obvious why Cambria was once known as Slabtown.

To Feed or Not to Feed?

By Norman Scott



Judy Lyon

DON'T FEED THE OPOSSUMS!!! This was the message loud and clear in a recent issue of *California Coast & Ocean*, a periodical of the Coastal Conservancy; and again in *Outdoor California*, the California Department of Fish and Game's fine public information journal. The author, Ron Jurek, voiced strong arguments against the feeding of any wildlife-any time, anywhere, and under any circumstances. Is this hard-line approach needed?

The deer and turkeys wandering the streets are a special part of the Cambrian life-style of "Living with a Forest." Many people have bird feeders that attract not only a gaudy profusion of feathered welfare recipients, but also the bandit squirrels that take over a feeder.

Raccoons regularly come to back porches and feed on pet food leftovers. There is even a pair of red-shouldered hawks that beg for chicken breasts on decks among the pines. Are all of these efforts to forge a stronger bond between humans and wildlife misguided, and potentially harmful, as Mr. Jurek asserts?

Regular feeding promotes local concentrations of wildlife that lose much of their fear of humans. Animals move into the area attracted by the free lunch, and they and their offspring show increased survival. This is exactly what the people feeding the animals want. These concentrations always have ecological impacts that are often not obvious.

Every work day I drive the stretch of Highway 1 between the Highway 46 turnoff and Piedras Blancas and count the raccoon carcasses on the road. Most of them are concentrated in the areas where people feeding the raccoons have produced populations many times greater than more natural habitats normally support. Not only are the people that feed the raccoons increasing the prevalence of rabies in Cambria's raccoons, they are increasing predation on other small animals in the area.

In our work as biologists, we radiotrack pond turtles and red-legged frogs in the local streams. Turtles and frogs near human habitation (Cambria, San Simeon, San Simeon Creek State Park) suffer levels of raccoon predation several times that of those in more rural streams. Unfortunately, pond turtles are most at risk when the females are on land searching for nesting sites. This increased mortality at a critical point in the life cycle has caused serious local population declines.

Clearly, some people do not show good sense in their attitudes towards wildlife; witness the bear feeders, the elephant seal riders, or the people who feed (and tame) coyotes in places where small children play. However, I believe that Cambrians generally have a level of intelligence that is higher than this, and, with a little thought, can tailor their activities to minimize unwanted ecological impacts.

I can suggest a few guidelines:

- Wild animals are not pets; they are neighbors. Treat them with respect, not as objects to control.
- Don't feed large quantities when smaller portions will do.
- Don't unintentionally feed wildlife by leaving unattended pet food outdoors.
- Don't make animals dependent on your feeding. Discontinue your handouts for a few months each year.
- Watch for diseases. Diseases are spread in the artificial concentrations developed around feeders. Band-tailed pigeon populations in Cambria are just recovering from a throat canker that decimated them in the 1980s.
- Become informed. The U.S. Fish and Wildlife Service has an on-line pamphlet "Backyard Bird Feeding" (<http://www.fws.gov/~r9mbmo/pamphlet/feed.html>) that provides many useful tips, and your local libraries and bookstores can provide other sources of information.

By using a little forethought and common sense, Cambrians can continue to enjoy the wildlife of the pine forest without causing unwanted ecological side-effects.

Architecture for the Forest

By Brent Berry

For a moment, let us ponder together the challenge and unique opportunity of building a home in the pine forest. Our first consideration should be that we are making a choice to become forest dwellers... And with that choice, there is a responsibility to respect and understand this forest habitat.

Most of us are aware by now of the legacy handed down by land speculators in the 1920's. Small 25 foot by 70 foot parcels, forming our Lodge Hill, Park Hill, and Happy Hill neighborhoods. The hope was that people would buy these small parcels for vacation cabins; and so the pattern played out. Most of these early cabins were simple structures of less than 1,000 square feet. They were easily situated between trees, with little disturbance to the natural forest. Even the access roads remained unpaved for many years.

We now know that this legacy of poor planning has taken a huge toll on the forest landscape. Simply look at a recent aerial photograph taken of our residential neighborhoods to see the impact of development. Today's lifestyles seem to require two, three, even four times the amount of square footage of those original cabins. We literally compete for space with the trees on these small parcels.

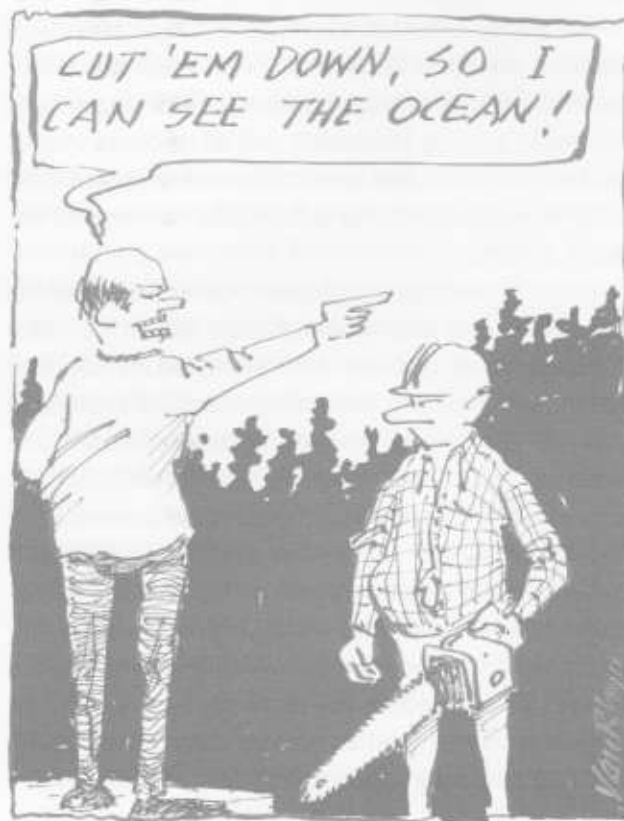
Add to this our fears of unstable and diseased trees, and fire, and we can see that our lifestyles are in danger of overwhelming our unique opportunity to live in harmony with the forest.

Examples of the future can be seen in built-out neighborhoods on Park Hill and Happy Hill—neighborhoods almost devoid of Monterey pines and native oaks.

If we are to choose to co-exist with our forest in harmony, should we not develop, as a community, an ethic of cooperation, built on respect and responsibility? An ethic which is expressed in an architecture which grows from within—outward. This means that native plants and trees, drainage patterns, sun, wind, vistas, established patterns of neighboring homes, and our unique forest lifestyles, all become EQUALLY important in defining a design solution... a solution which is shaped and scaled in response to these elements.

The infinite variety of shadow, pattern, and texture found in the forest landscape will influence our choice of exterior materials such as lapped siding, shingles, and stone, which express shadow and pattern, and actually improve with age, assuming a beautiful belonging. Bark, pinecones, needles, native plants and flowers all become inspiration for our color pallet. The forest's need for natural drainage patterns will inspire us to pave with permeable materials such as brick and stone set in a sand base, and decomposed granite and gravel.

In essence, our choice to become forest dwellers allows the FOREST to influence our lifestyle. In so doing, we realize the incredible uniqueness such an opportunity affords—a uniqueness that is reflected in architecture that is truly Cambrian in character and style.



Art Van Rhyn

Homebuilding in Cambria

By Rich Davis

When the ax comes into the forest, the trees, seeing the handle, say to each other, "He is one of us."

— Hassidic proverb

Unfortunately, the first step in building a home in Cambria often is to remove trees. It's easy to see the irony in this. We are cutting down trees in order to build a home in the pines. Let's face it, our forest is one of the most appealing aspects of our community and it greatly contributes to people's desire to live here. Specifically, to buy a lot and build a home here. And yet we must remove trees in order to do this. I'd like to share some of the insights I've gained over the years concerning trees and construction.

The trees standing within the footprint (the perimeter of a new house) are obvious goners. The architect or designer of the home indicates the location and size of each tree to be removed on the building plans and the County Department of Planning and Building gives tacit approval to remove them by granting a building permit. They also require a two-for-one replanting (more on this later).

At this point it is usually up to the builder to mark the trees for removal. Over the years we've learned that there are often trees outside the building footprint that will not survive the construction process. Anyone who has seen the root system of a tree that has uprooted in a storm knows that our Monterey pines have a very small anchorage. The roots are shallow and there is no tap root. A backhoe digging a footing trench within 4 or 5 feet of a mature tree will severely damage that tree's root system and either kill the tree or leave it so unstable as to make it a threat to the new home or those close by. Often, the tree locations on the plans are off by a few feet, and it is not apparent until we actually lay out the house on the lot that an additional tree needs to be removed.

In some cases this could be prevented by better planning. A jog in a building line or changing the location of a driveway a few feet can make the difference between leaving a tree or having to remove it. Unfortunately, in many cases we are building

large houses on relatively small lots, and there just is no room to make those adjustments.



Lynn Rathbun

I feel the 2 for 1 replanting requirement is a key factor in making up for the loss of forest caused by construction. In the past it was assumed that the replanting had to occur on the lot where the trees were removed. In many cases this proves impractical. By the time we build a 2500 square foot house, with roof overhangs, on a 50 by 70 foot lot there is no place for 10 or 12 Monterey pines to grow to maturity. Often the replacement trees have been planted and then neglected or not planted at all.

The solution is to plant the replacement trees on another site. There are hundreds of retired lots around town where trees can be placed. There are also public lands and areas such as utility easements available for planting. Naturally, permission from the land owner is needed before planting. Contact the Cambria Forest Committee for more information at 927-6223.

In this way we can help regenerate the forest. The recent infestation of pitch pine canker will cause the death of many trees, making it all the more important to replenish the forest wherever and whenever possible.

One Realtor's View

By Molly Lynch

Your neighbors are in danger! You are probably wondering, what neighbors? Let me explain:

As a Realtor, I spend a great deal of time showing property and discussing the different communities on the central coast. Cambria is uniquely different from the other communities because of the Monterey pine forest. We have a living, growing, renewing, biological force with which we share our lives. The pine trees are of such diversity—all different sizes, ages, shapes, and colors. The forest truly provides a spirit of community that is a model of cooperation.



Art Van Rhyin

As a Realtor, clients tell me that one of the important reasons they selected Cambria to look for a future home was due to the beauty and grace of the trees on our hills.

Surprisingly, the presence of trees does not add monetary value to the property. But the presence of the trees does add value from the perspective buyer's view, perhaps not monetary, but certainly a sense of connection to nature and the coastal beauty for which they have been looking.

When I am with clients they understand the difference in the areas of Cambria and the homes and

lots that are available. Visiting the different "hills," one can readily see how some homes have been designed and built with an eye towards preserving and nurturing the existing trees throughout the construction process, thus creating a graceful and stately ambiance to the property.

When I represent someone in a purchase and we are discussing the community and what it is like to live in Cambria, invariably the conversation goes beyond the schools, shops, and churches to the forest trails to walk in the area.

As you all remember, there are numerous forms involved in the sales transaction for real estate. One, created to inform buyers of things significant to this specific area, has a disclosure that our forest is being affected by Pine Pitch Canker. I am always asked about the diseases that we see in our forest, and a sense of concern and fear of loss of the pine trees is expressed.

My definition of neighborhood includes more than the homes in a geographic location. Included in my sense of neighborhood I offer that the trees and forest are also the "neighbors," and the main members of the forest neighborhood here are the Monterey pines and the coast live oaks.

Perhaps saying our neighbors are in danger is a bit dramatic, but the truth of the matter is that our pine forest is threatened by disease and by development. Hopefully, we all approach the protection of our forest seriously. I know that one positive benefit from the discussions I have with clients, which is realized again and again, is that we all need to stay abreast of new information regarding the care of our trees.

The recently held Forest Fair, sponsored by Greenspace, The Cambria Land Trust and the Cambria Forest Committee was an example of people coming together to gain more information about our forest, including the diseases affecting it, and what we all can do to protect it.

Perhaps each of us will begin to recognize the various issues associated with our forest neighborhood and in the process begin to communicate to each other our mutual desire to maintain the forest, and our unique region, in a spirit of cooperation.

PG&E in the Forest

By Jack McCabe

Pacific Gas and Electric Company is one of the most active tree work operators in Cambria. Surprised? I am sure when you think of PG&E, you think of its primary role: to deliver safe, reliable electricity to approximately 5,000 customers who live and work in Cambria. But did you know that in the last year alone, PG&E contractors have inspected and pruned thousands of trees locally? Its true. In addition, they have removed or made safe several hundred dead or hazardous trees.

PG&E is required to comply with State laws that mandate that all vegetation be cleared away from high voltage lines. The main reasons for keeping trees from contacting electric lines are: (1) safe electric facilities—there is a higher potential for people to come in contact with electric voltages when they climb or work in trees growing close to power lines; (2) fire prevention—trees contacting high voltage lines may drop sparks that could cause wild fires; and, (3) reliable electric service delivery—tree contact with high voltage lines can cause power outages that disrupt electric service.

As an arborist, I believe it is also important to prune trees away from power lines because contact with high voltage electrical facilities can wound or damage trees, which may trigger further long term stress to the tree. This is particularly important because the health of Cambria's forest is generally poor due to a number of factors, including urban development, bark beetles and pine pitch canker.

PG&E recognizes the uniqueness and value of Cambria's native Monterey pine forest and understands that its tree trimming operation can influence factors currently threatening forest health. PG&E has modified its Vegetation Management Program in several ways that promote the best forestry and arboricultural practices. These operational changes include work scheduling, tree trimming practices, and proper waste disposal.

Over the last two years, PG&E has scheduled its routine tree work in Cambria to occur during the cold weather months. This is when the most serious insect pests of native Monterey pines, bark beetles, are inactive. These insect pests can be attracted to wounded trees or to fresh pruning cuts. They can

spread pine pitch canker to healthy trees, or overwhelm already stressed trees to the point of death.

All PG&E tree contractors employ directional pruning techniques as recommended by the International Society of Arboriculture. When working in areas where trees are infected with pine pitch canker, tree crews are instructed to disinfect their tools after their use on pines. Using Lysol or a bleach and water solution to clean tools will help keep the fungus from spreading to uninfected trees. Only mature trees that are dead, dying, or pose immediate hazards to PG&E facilities are removed. While younger trees planted or growing directly beneath the power lines do not pose the same threat to PG&E facilities, it is these trees that often become most stressed due to the need for continual topping. These trees may be removed with the permission of the property owner. Removal of any tree greater than eight inches in diameter requires authorization by the County Planning Department.

Debris and green waste resulting from line clearance work is chipped and either spread over the ground to promote drying, or else transported to a green waste disposal center. This allows the pitch canker infected material to dry out, as well as keeps beetles from using that debris for breeding purposes. The chips are tarped inside covered trucks whenever transported between locations. Customers are instructed to tarp remaining wood to further prevent beetles from breeding. Wood or green waste infected with pine pitch canker should never be moved or transported out of the area.

PG&E is committed to promoting forest health in Cambria, balanced with the need to meet State requirements, and maintain safe, reliable delivery of electric service to all customers. PG&E will continue to modify its line clearance procedures as experts in forestry, entomology, and environmental preservation determine new management practices. In the months ahead, look for a PG&E consulting forester inspecting the trees adjacent to power lines in your neighborhood. If you have any immediate concerns or questions regarding PG&E's trimming practices, or see trees growing close to elec-

trical lines, please call 1-800-743-5000. And always remember, plant smaller growing trees under and near electric lines. Trees that will reach heights over

25 feet at maturity should be planted at least 15 feet away from overhead lines.



Art Van Rhyn



Tomorrow and Beyond

Pitch Canker in Cambria — What Does the Future Hold?

By Thomas R. Gordon



Lynn Rathbun

In the Appalachian Mountains at the turn of the century, forests were dominated by the venerable American chestnut tree. Ranging from the Canadian border to the Gulf of Mexico, this species comprised fully 50% of the value of eastern hardwood timber stands. Today these massive, seemingly invincible sentinels of the forest are

gone, victims of an exotic fungal pathogen inadvertently delivered to our shores from the Old World. Is this the fate that awaits Monterey pines, at the hands of the pitch canker pathogen? Here I offer a researcher's perspective on the pitch canker epidemic in Cambria, and what can and cannot be done to address the problem.

Pitch canker is caused by a fungus which goes by the name of *Fusarium circinatum*. The disease has a long history in the southeastern U.S., but was not recognized in California until 1986. Pitch canker probably reached Cambria soon thereafter, although it remained undetected until 1994.

Sadly, there are no effective treatments for infected trees. Pesticides directed against the pathogen or the insects which carry it are futile. Individual infections can be removed by pruning, but new ones will continue to occur. Although pruning wounds themselves do not become infected, the resin they produce may attract bark beetles and increase the risk of new infections.

So, little can be done to influence the fate of an infected tree. The rate and extent to which the disease progresses will depend on a number of factors, the most important of which is the inherent susceptibility (or resistance) of the tree to pitch canker.

Fortunately, research has confirmed that all native populations of Monterey pine include resistant individuals. So, although the overall proportion of resistant trees in the Cambria population is unknown, we can reasonably expect that some trees will sustain little or no damage from pitch

canker. In fact, it is already possible to see trees which are likely to be resistant. In many areas where the disease is well established, one or more disease-free trees can be found. The longer these trees remain free of symptoms, the more likely it is they are resistant to pitch canker.

Trees which are resistant to pitch canker obviously represent a valuable source of genetic material for future generations of Monterey pine. How can this resource best be utilized? The answer depends on the larger question of how the forest will be managed.

In the absence of human intervention, natural regeneration will eventually release the genetic potential residing in seed now on trees and in the soil. As new trees become established they will be challenged by the pitch canker pathogen and those which are susceptible will be weakened or killed by the disease. The more resistant trees will survive longer and produce more seed than those which are susceptible. Thus, over time, natural selection will increase the proportion of disease resistant individuals as the forest adapts to the residency of the pitch canker pathogen.

Unfortunately, regeneration is a slow process and in the interim, residents of the forest must endure an increasingly unattractive landscape. Moreover, the pace of regeneration in a fragmented forest where fire suppression is of paramount importance, will be uneven at best. The alternative is to accelerate the replacement of susceptible trees through the selection and propagation of resistant trees. This approach is not without pitfalls, but certainly merits consideration for inclusion as part of a broader plan for management of the Cambria forest.

Happily, efforts to promote forest health, in general, will also contribute to the management of pitch canker. In short, the healthier the forest, the more rapidly and predictably it will regenerate and the sooner resistant trees will replace those which are susceptible. Perhaps the reality of pitch canker in Cambria can help unite the community behind a plan of action that will help to ensure the health of the forest into the future.

Forest Protection in Cambria

By Richard Hawley

The Cambria stand of Monterey pines is only about 3,500 acres. About a third of this has already been lost to development of one kind or another, yet the pressure to expand the Urban Services Line is enormous. The majority of land that shares a common border with Cambria's crisp boundary is forested. If one looks at an aerial view of our town one can readily see how the forest is disappearing within the Urban Services Line. How can we prevent urban sprawl from gobbling up more of our small forest?

Land trusts have a unique set of tools that is designed to provide financial incentives to property owners and others who aim to conserve important lands. These areas can be wetlands, agricultural property, viewsheds, grazing lands, riparian areas, and, as in our case, forests. Setting aside park and recreational lands is equally important and provides a value to the public.

The tools of a land trust are varied, ranging from simple purchase agreements to complicated trades and easements. There are three broad categories of land-saving methods: conservation easements, donated lands, and purchased lands. Each of these categories has subsets of options.

For instance, a conservation easement may be accepted by a land trust in three ways: by 1) accepting a willed conservation easement, 2) purchasing a conservation easement, and 3) accepting a gift of a conservation easement. With conservation easements, owners protect their property while retaining title. The conservation easement merely restricts, by mutual agreement, the type and amount of development that may take place on the land. By placing these restrictions on your property, the Internal Revenue Service provides ways to save on property, estate, or gift taxes.

The second broad category is land donations, which may also be carried out in a number of different ways, including outright donations, donations by will, donations of undivided partial inter-

ests, donations of a remainder interest, and donations that establish a life income. Each of these options provides a variety of tax saving incentives to the property owner.

Donations can be made in many other forms, including cash, real estate, art work, stocks, bonds, and charitable remainder trusts. These assets can then be turned into land purchases.

The third broad category of protecting land is selling, within which, as you might have guessed, there are several options. They include fair market value sale, installment sale, option to purchase, right of first refusal, and sale of other property interests. Some of these options provide financial incentives to property owners from a tax point of view. Others, like fair mar-

ket value, do not have any charitable contributions associated with them and therefore do not qualify for any tax savings.

These land-saving options provide land trusts with the tools to protect natural resources that benefit the public. The critical component, of course, is that a property owner be willing to sell, donate, or place a conservation easement on his or her property.

Many folks simply do not understand how land trusts work or how to go about taking the initial step to find out how to protect their lands. A call to a land trust such as Greenspace - The Cambria Land Trust, is the first step in learning about the options available to you and if the options make financial sense to your situation. However, land trusts are not tax advisors, and tax consequences are always best handled by each property owner's tax advisor.

Greenspace has been fortunate to have been able to protect some of Cambria's forest lands by purchasing large properties, as well as receiving donations of land. People and businesses may receive substantial tax advantages from donations to a charitable organization, and their donations may result in forested lands being protected for all Cambrians.



Lynn Rathbun

Genetic Conservation of Monterey Pine

By Deborah L. Rogers

Would it help to call it GeneGate or Gene Drain? Genetic conservation can't compete with the alluring or tragic headlines demanding our attention in the newspapers. Yet without careful attention to genetic diversity our Monterey pine populations—including the Cambria population—are at risk in the long term.

Genetic diversity is often not immediately obvious: we may recognize differences in the size or age or architecture of a Monterey pine tree, but genetic diversity goes beyond the obvious. It is accumulated potential, residing in the DNA, that may be expressed in future generations. This potential may offer life-saving attributes in resistance to an insect or disease, ability to tolerate climatic changes, adaptability to changing soil conditions, or opportunity for new products. In short, genetic diversity may be considered part of the long term life insurance policy of a species. It is not a guarantee, but it offers potential.

Genetic diversity is apparent in the Cambria population of Monterey pines. We know that there are genetic differences between this population and the others in terms of the growth rate of the trees, the size of the cones, resistance to cold, resistance to certain diseases, and other features. Furthermore, we know that there is considerable genetic diversity within the Cambria population. These differences may reflect specific adaptations of this population to the natural conditions of Cambria. The full extent of this genetic diversity—and what it means to the different Monterey pine populations—has not been fully explored.

Conservation of genetic diversity is more complicated than simply setting aside some of the trees in a nature reserve. Consider the metaphor of conserving the diversity of a small town: putting a fence around half of the town's physical area would not be expected to conserve a balanced representation of that town's diversity. Nevertheless, practicality may demand that we determine how to conserve a representation of that diversity. This requires knowledge of the nature of the town, and how it is spatially distributed. And it also requires a knowledge of just how the town's population is

dependent on the services and interactions within the community for its long term viability. So in the forest we need to understand, for example, how far pollen and seeds travel, what factors most affect seedling survival, and when cones open to shed their seeds.

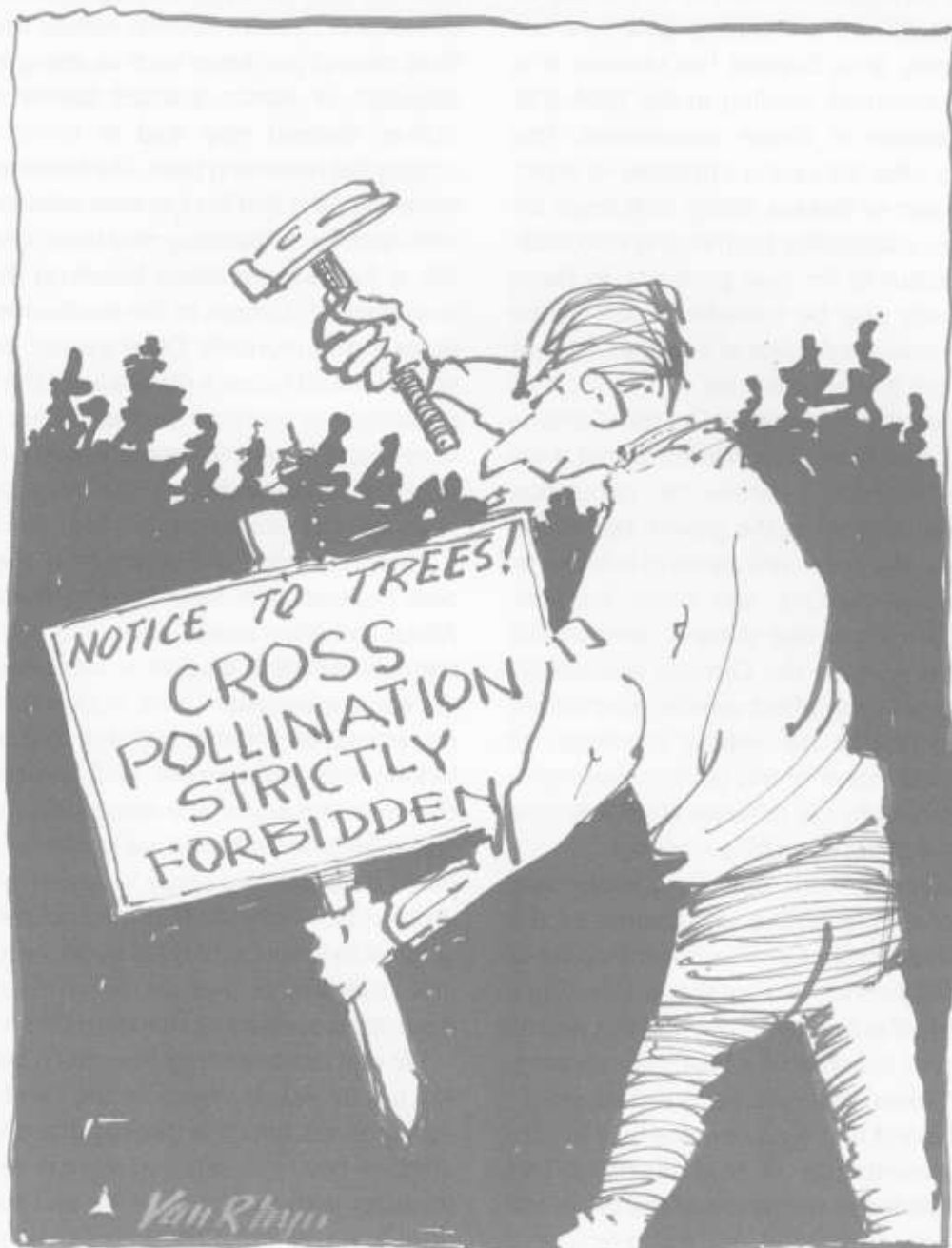
Loss of genetic diversity within a population may not be immediately obvious. One scenario is that the loss of trees, through human activities (removal of trees for houses), natural causes (death from natural processes such as aging, insects, and diseases), or human-assisted causes (pine pitch canker disease) may lead to more inbreeding among the remaining trees. The fewer the trees, the more likely it is that they or their children will breed with relatives. Inbreeding may lower genetic diversity in future generations, lessening the potential to withstand changes in the environment, leading to increased mortality. Once genetic diversity has been reduced below a certain level, this may lead a population or species to extinction. For this reason, large losses in genetic diversity have been referred to as "silent extinctions": the trees may still be there, but the future potential has been decimated.

There are trees and seeds from the Cambrian pine population in New Zealand, Australia, South Africa, and other countries. So why won't an international botanical garden or seedbank suffice for genetic conservation? One reason is that it's not representative. Another is that it's out of context—lacking the environment and natural processes that maintain and shape diversity in the long run. Those trees or seeds that are in plantations or seed banks elsewhere are only a 'snapshot' of the genetic diversity. Finally, the international seedbanks are vulnerable too, as witnessed by fires and other natural disasters, as well as the consequences of downsized budgets or changing priorities.

We don't know exactly how much genetic diversity has been lost already in the Cambria population of pines, how this genetic diversity is distributed, or how it is affected by the environment. However, with careful planning and consideration of existing information, we can have a positive impact.

An effort is underway to understand the nature of genetic diversity in Monterey pines, including the Cambria population, and develop a plan for its conservation. The Genetic Resources Conservation Program—a University of California program charged with the mission of supporting genetic conservation of California's (nonhuman) species—

is coordinating the development of such a plan. This plan will be coordinated with the development of other and broader conservation efforts, such as the Natural Community Conservation Plan. With these efforts, it is hoped that a silent extinction will be avoided.



Art Van Rhyn

Is Cambria Ready for Forest Management?

By Richard Hawley

The three remaining native Monterey pine forests in California (Año Nuevo, Monterey, and Cambria) are under extreme stress due to disease and development. For instance, Cambria's stand of Monterey pine has lost fully one third of its area due to development. The picture gets bleaker when you add to this scenario tree deaths caused by bark beetle infestations and diseases like pine pitch canker. The name "Cambria Pines by the Sea" could well be changed to "Cambria by the Sea."

As our pines disappear, will our identity be lost? Will our property values be diminished? Will we be challenged by the staggering cost of removing dead trees that may reach into the millions of dollars? The answers to these difficult questions are complex, but not insurmountable. "Ecosystem management" may be the solution to our problem of managing people and pine trees.



Pine seedlings (actual size)

Lynn Rathbun

What is ecosystem management? According to the Colorado-based Keystone Group, a prestigious national policy organization, ecosystem management is "a collaborative process that strives to reconcile the promotion of economic opportunities and livable communities with the conservation of ecological integrity and biodiversity." In other

words, it is a process by which development that is compatible with protection of a healthy environment is encouraged.

One method to implement ecosystem management is to develop a Natural Communities Conservation Plan (NCCP). The NCCP program is an innovative state effort to protect disappearing habitats that support unique species (in this case Monterey pines) before it becomes necessary to designate the species as threatened or endangered under the state or federal endangered species acts. The program is designed to protect and manage habitats that are unique in themselves, protect individual threatened and endangered species that live in these habitats, AND allow for reasonable economic activity and development on affected lands, much of which are privately owned.

Currently, the Monterey pine tree meets all the requirements to be listed as a threatened species under the California Endangered Species Act. Although the NCCP program is not fully an alternative to the state Endangered Species Act, it can be complementary. Indeed, it is the prospect of listings a species as threatened or endangered that creates the incentive for people to participate in the NCCP program. When it comes to developable land and unique habitats, people have varied agendas. These varied agendas can be reconciled through a NCCP by allowing compatible development and protection of the unique resources, simultaneously. The stalemate and inevitable legal battles that often accompany a species' listing as threatened or endangered make a positive incentive for the NCCP program to work.

As a member of the Pine Pitch Canker Task Force, I am analyzing the merits of the NCCP program, and looking into the feasibility of implementing a NCCP for the remaining three native Monterey pine forests in California. Whether to proceed with the listing of the Monterey pine as a threatened species, implement a NCCP program, or do both will be the topic of discussion in the months ahead. In any case, I think most of us Cambrians realize that the time has come to develop a plan for managing our pines, and we who live among them.

The Last Word

By Galen Rathbun



Lynn Rathbun

Organizing and editing the "Living With A Forest" column over the last 13 months with Lynn, my wife, has been reassuring. We now know that there are a lot of fellow Cambrians that care deeply about our native forest.

One of our goals for the column was to inform fellow

Cambrians about some of the biological and social issues associated with being part of a forested biological community. Another objective, and every bit as important, was to rally interest and support for protecting our unusual woods.

If you have read the 33 essays that have appeared in this column, you know that our Monterey pines are indeed unique—not only is our forest one of only three small native populations, but "our" pine is one of the most important commercial timber species in the world.

By now, you are also aware of the serious issues that we must face if we are going to continue to live in the pines. Among the many topics are pitch canker control, poor building practices, wildland fire, and hazardous tree reduction.

That pitch cancer is beginning to impact our trees is obvious by the increasing number that show the characteristic flagging (yellowing and dying tips to branches). After our recent wind storm, none of us need to be reminded about the hazards of living under trees. Fortunately, we have not yet experienced a wildland fire, but to reduce this risk we need to carefully manage our habitats and behavior.

Based on the response to these columns, I know that there is broad support for protecting our oak and pine forest. Support is also seen in other ways, such as the hundreds of license plate holders declaring "CAMBRIA PINES BY THE SEA" and our unofficial town flag that features a Monterey pine. Next time you see a Cambria Community Services District truck, take a close look at the gold and black seal on the doors.

But we need to do more. Unless many of us get actively involved with forest issues, we are going to lose our native trees, and many of the other plants

and animals that rely on them. Without our oaks and pines, we will be just like all the other seaside towns from here to Los Angeles houses squeezed together on the hillsides, trying to get that peak of the ocean. Our forest helps define our community and thereby makes us different and a highly desirable place to visit and live.

Because our forest is suffering from several problems related to our presence, we need to develop some rules by which we all can live that will ensure that the native plants and animals will continue to thrive. We need a forest management plan. If there were only five people living in the woods here, there would be virtually no need for any rules to ensure the continued existence of the forest. If there were 500 souls, we probably could still get along without regulations. But now that we are well over 5000, we can not all do what ever we want without causing serious, long-lasting habitat destruction. In short, to prevent fouling of our own nest we need a forest management plan.

The citizens of Monterey, who also live with native Monterey pines, decided several years ago that they needed to manage their forest, and they agreed as a community that they would support such a program. We Cambrians need to catch up with Monterey.

We have a citizen's group called the Cambria Forest Committee, which is working closely with the Cambria Community Services District, the County of San Luis Obispo, and the California Department of Forestry and Fire Protection, to develop a management plan. If this plan is going to succeed, however, we must define some rules to live by in order to ensure that the forest is not destroyed, and we must find a way to make sure that our rules are followed. We also need to figure out how to support forest management for the long term in Cambria.

Here is my message: GET INFORMED AND INVOLVED. The Cambria Forest Committee meets at 7:00 PM on the last Wednesday of each month at the Veterans Hall in Cambria. Some people may find the meetings a bit technical, and discussions sometimes get rather lively, but it is vital that we all become informed and involved, and eventually support forest management.

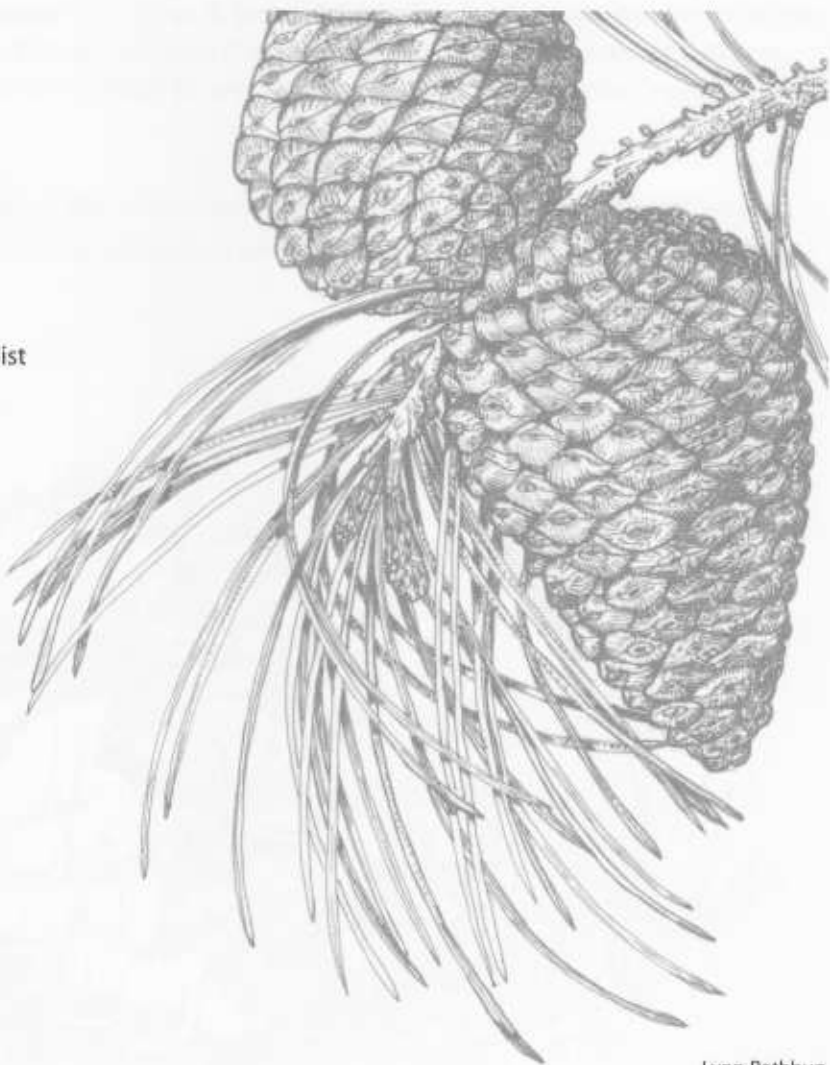


Linda Warren Seek

About the Editors, Authors and Illustrators

- **David Adams** is a forest pathologist recently retired from the California Department of Forestry and Fire Protection in Davis. He has worked extensively with Monterey pines in Cambria.
- **Brent Berry** has practiced architecture in Cambria for 28 years.
- **David Chipping** is Professor of Geology at Cal Poly in San Luis Obispo, and Vice President for Conservation, California Native Plant Society.
- **Rich Davis** lives in Cambria, where he has been a general contractor for 18 years.
- **Mark DiMaggio** teaches Environmental Science at Paso Robles High School. He and his family have lived in Cambria for 13 years.
- **Julie Eliason**, who lives in Cambria and works as a Wildlife Biologist at Camp Roberts and Camp San Luis Obispo, coordinates the endangered species program for the California Army National Guard.
- **Robert Farino** is a firefighter with the Cambria Fire Department, and has a B.S. degree in Forestry from Cal Poly, San Luis Obispo.
- **Thomas R. Gordon** is a University of California Professor, and along with his colleagues at Davis and Berkeley, has been studying pitch canker in California since 1987.
- **Bill Hanna** is an 18-year Cambria resident active in local conservation politics.
- **Richard Hawley** is Executive Director of Greenspace - The Cambria Land Trust.
- **David Krause** is a past president of the San Luis Obispo Chapter of the California Native Plant Society and teaches science at Paso Robles High School. David and his family have lived in Cambria for over 15 years.
- **Jeff Kwasny**, a Rangeland and Wildlife Specialist with the US Forest Service, lives in Cambria and is involved in re-establishing native grasses on coastal prairies of the Big Sur coast.
- **Bill Libby**, Professor Emeritus at the University of California Berkeley, is a forestry consultant who lives in the San Francisco Bay Area. He is currently writing a book *The Remarkable Pine* with Australian and New Zealand colleagues.
- **Rich Little** is an entomologist with San Luis Obispo County. He spends his time chasing spiders and other little things that are so important to our world.
- **Molly Lynch** is an 18-year resident of Cambria. She is a Broker-Associate with Coldwell Banker Don Bricker Real Estate.
- **Judy Lyon** is a Cambria artist who feels extremely lucky to have found this Paradise almost 25 years ago.
- **Nancy Mann** teaches biology at Cuesta College. She studied Steller's and scrub jays for her Master's thesis, and still keeps a bag of peanuts handy.
- **Jack McCabe** is a Certified Arborist and Senior Forester with Western Environmental Consultants, and is contracted as a technical consultant to PG&E's Vegetation Management Program.

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- **Galen Rathbun** is a research ecologist with the US Geological Survey and California Academy of Sciences. He has been studying declining species and their habitats in the Cambria area for 16 years.
 - **Lynn Rathbun** is a trained biologist and an artist who has lived in the area for 16 years.
 - **Aryan Roest** is a retired Professor of Biological Sciences at Cal Poly in San Luis Obispo. He is still interested in the animals of the central coast, and photographs and writes about them.
 - **Deborah Rogers** is a Forest Geneticist and Conservation Biologist with the Genetics Resources Conservation Program of the University of California at Davis.
 - **Norman Scott** is a member of a team of U.S. Geological Survey research biologists that work out of the Piedras Blancas Lighthouse and study the aquatic animals of the local streams.
 - **Brad Seek** has seen nearly 17 summer fogs come and go while living in Cambria.
 - **Linda Warren Seek** was a wildlife artist, a biological consultant, and a Cuesta College biology instructor.
 - **Greg Smith** is the District Resource Ecologist for California State Parks in San Simeon. He has been monitoring bird populations along the North Coast for 18 years.
 - **Kathe Tanner** has been a photojournalist or columnist for *The Cambrian* and *The Tribune* since 1981, and has lived in Cambria since 1971.
 - **Rob Trask** is a resident of Cambria and is active in several local environmental groups.
 - **Kellen Trimble** is a Cambria High School student; he intends to pursue a career in entomology.
 - **Art Van Rhyn** looks at the world (and Cambria) through cartoonist's eyes and with a great deal of tongue in cheek.
 - **Forrest Warren** is a native Cambrian who is also a local historian.



Lynn Rathbun

