



Understanding Our
OAK TREES

City of SANTA CLARITA

TO THE HOMEOWNERS OF THE CITY OF SANTA CLARITA

Dear Homeowner:

Oak trees are a significant part of the pastoral beauty of the Santa Clarita Valley. In recognition of their contribution to the natural environment, the residents, through their local government, have enacted an ordinance to protect them against removal or damage.

Through the joint efforts of the land developer, builder and the City of Santa Clarita, your homes have been integrated into a former oak woodland environment. You are fortunate to have at least one of these magnificent sculptures on your property.

Oak trees are delicate when they are located in an artificial environment such as presented on your plan. Therefore, the purpose of this letter is to help you understand the continuing maintenance which is necessary for their survival within such an environment.

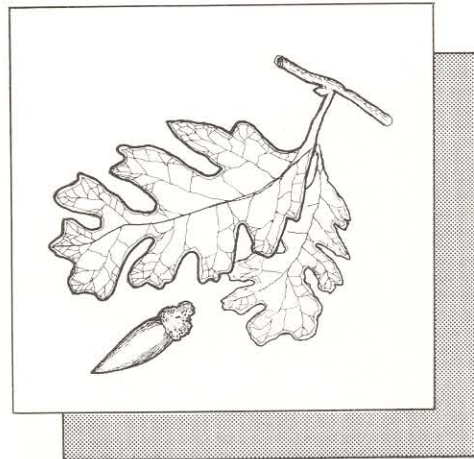
There are two major varieties of oaks found in the Santa Clarita Valley: the evergreen Coast Live Oak (*Quercus agrifolia*) and the deciduous Valley Oak (*Quercus lobata*). The Live Oaks outnumber the Valley Oaks by three to one. This is due primarily to the fact that we are at the southern extremity of the Valley Oak biological life zone and that the Valley Oak most often occupies the relatively flat valley floors where development generally occurs. Severe stress results from both natural forces and man induced trauma, making the Valley Oak more delicate than the Live Oak.

Valley Oak *Quercus Lobata*

Large deciduous tree 60'-75' high, broadly spreading 50'-80' wide.

Leaves: Deep green, 3"-4" long; paper-like texture with rounded lobes on the leaf edge.

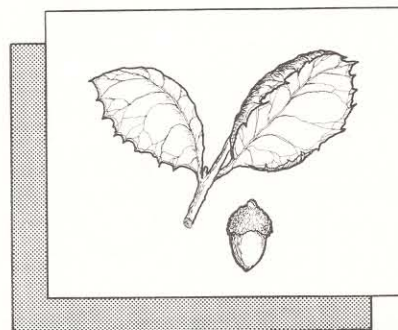
Tends to favor valley bottoms: for this reason the valley oak has disappeared from the landscape more rapidly, impacted severely by agriculture and urban development.



Coast Live Oak *Quercus Agrifolia*

Large evergreen tree with a broad, round shape and large limbs. 35'-80' wide.

Leaves: Glossy green, 1"-3" long; spiny, rounded, and holly-like; but distinctly cupped or curled under at the edges.



Interior Live Oak *Quercus Wislizenii*

Evergreen tree 30'-75' high or a shrub 8'-10' high in chaparral areas. Has a full, dense rounded shape, not broad or with large limbs like a coast live oak. They tend to grow in clumps rather than as a single tree.

This tree may be present in small numbers in the outskirts of the City of Santa Clarita. It has not been found however, within the central area of the city.

Leaves: Dark green, 1'-4' long. Edges either smooth or shiny, but always flat—not curled under.

Other common oaks:

California Black Oak:

Quercus Kelloggi

Canyon Live Oak:

Quercus Chrysolepis

Engelmann Oak:

Quercus Engelmannii

Oak trees have value beyond their aesthetic appeal. They give shade and help reduce air conditioning needs. Their root systems help control soil erosion. They provide shelter from the blistering summer heat and moisture to our atmosphere. For all the benefits, they require only periodic watering, fertilizing and, occasionally, minor pruning.

Many of the trees within this woodlet are older than 400 years. They represent the best physical examples of our heritage and outdate most of the history of our country. Just think—some of these trees were already 150 years old when George Washington, the "Father of our Country," was born. They are certainly worthy of our care.



Age, along with alterations of the natural environment, such as a falling water table, loss of leaf litter normally found beneath their canopy, and the past agronomic uses of the land, have weakened the oak and have made them dependent upon proper care and watering from private property owners for survival.

CARE OF OAKS

Growth Characteristics

Thru eons of time the oak has survived in our harsh xerophytic environment. They have depended solely upon the natural water cycle and their own ability to draw adequate quantities of water away from draughty soils, the ability of the soil to provide nutrient value, and their own leaf mulch for fertilization. This explains why the oak, in its undisturbed natural setting, has developed an extensive and somewhat shallow root system.

Extensive field experience has shown us that a major network of feeder roots develops within the upper horizons of undisturbed soils. Below these, at depths of one to three feet, bundles of roots radiate in all directions from the tree with only minor divergence. At the tips of these roots are found the very small hair-like feeder roots which collect water and nutrients in solution. It is not uncommon for these conduit-like bundles to be comprised of many primary 1"-8" diameter roots that extend 100 feet or more beyond the dripline of a mature tree. "Drip Line" is the technical term for an imaginary line projected on the ground under the furthest extension of the oak tree branches.

The primary division of these roots

is downward in what are described as sinker roots. Sinker roots are smaller, fan out into many subdivisions and have a profuse number of feeder roots. Most sinker roots occur beneath the leaf crown and inside of the dripline of the tree, and are found more plentifully near the trunk.

It is believed that these two root types have different functions. The horizontal roots are thought to operate more effectively during the wetter periods of the water cycle and the sinker roots during the dryer periods. Sinker roots, depending upon the soil profile, generally extend to depths of 3-5' into a zone of continuous year-round moisture.

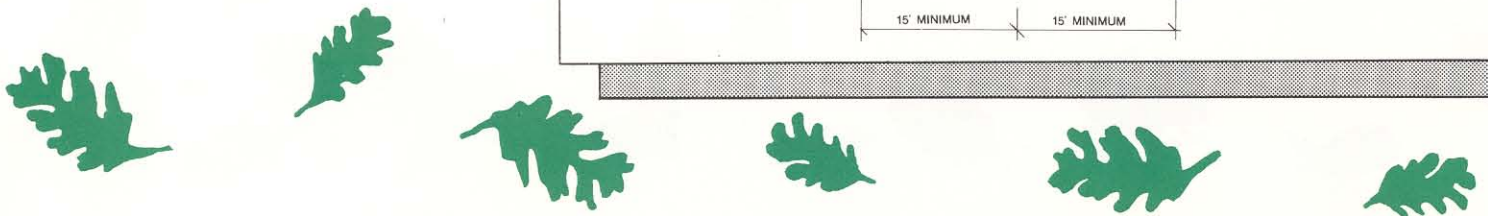
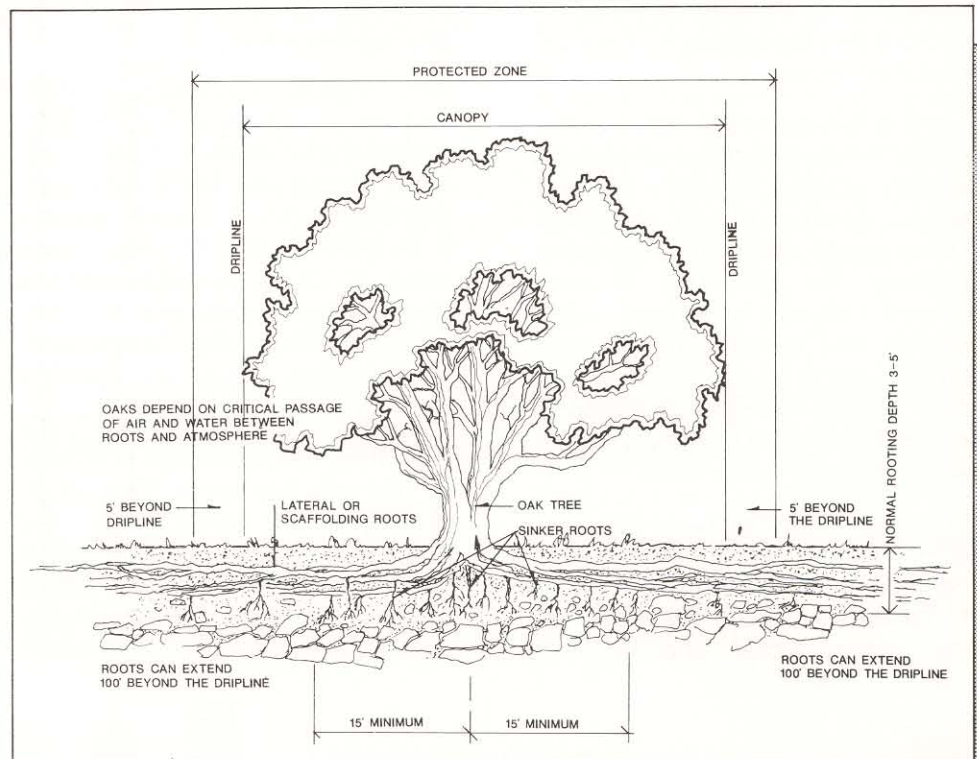
Contrary to common belief, neither variety of oak tree has a functioning tap root. While tap roots are normal to young sapling and immature trees, they atrophy over an unknown period of time during the life of a tree. Observations during the removal of approximately 200 trees throughout the Conejo Valley has confirmed this fact.

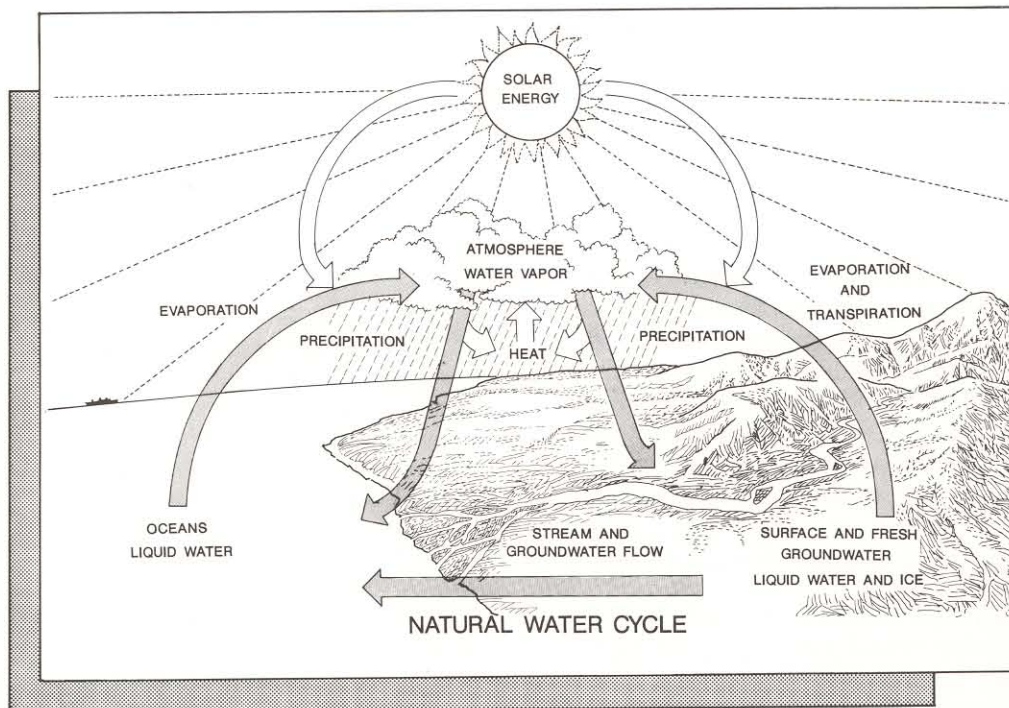
When an oak tree is located on a slope, roots often chase long distances downhill following water. In these situations, the uphill rooting, functioning more as anchorage, will be less extensive and less important to the survival of the tree.

Watering

Oaks in a "natural undisturbed environment" are highly adapted to the natural water cycle. They have developed efficient mechanisms to survive the dry months of a year and periodic droughts which last for several years on occasion.

The most obvious of these mechanisms, that can be seen visually, are leaf crown density, leaf size and the curling of individual leaves to reduce transpiration. Another example, employed mostly by the Valley Oaks, is for an individual tree to begin early dormancy. That is to say that the tree would lose its leaves a month or so earlier than other trees of the same species and environment conditions.





In twenty years of oak tree work the author has observed very few oaks in "natural" environment settings in Southern California. This is due primarily to the extensive agromonic use of the lands over the past hundred years.

During this period of our history, cattle, sheep and other small herbivores grazing beneath the oak trees, destroyed soil structure changing the ability of rain water to infiltrate the soil. This in turn caused a change in ground water storage and subsurface flow patterns. Critical loss of cutoff water, that portion of rainwater which enters the soil, has resulted in water stress in most native oaks.

Grading for development has also affected water availability to many oak trees in urban settings. In order to create level pads for housing, subsurface storage and flow of

ground water are often disrupted. Stabilizing slopes necessitates the bedding or starting of fill slopes well into bedrock. This operation redirects or dams subsurface groundwater flow.

The creation of cut slopes above and below oak trees is also detrimental to the survival of oak trees. Often we see oaks left on a mound, with cut slopes all the way around it to lower levels. In these cases most, if not all, available water is disrupted leaving the trees to desiccate. In this situation supplemental watering is of an absolute requirement.

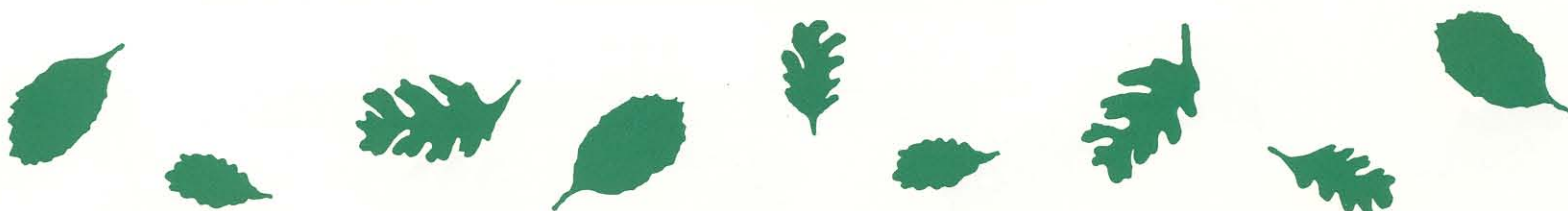
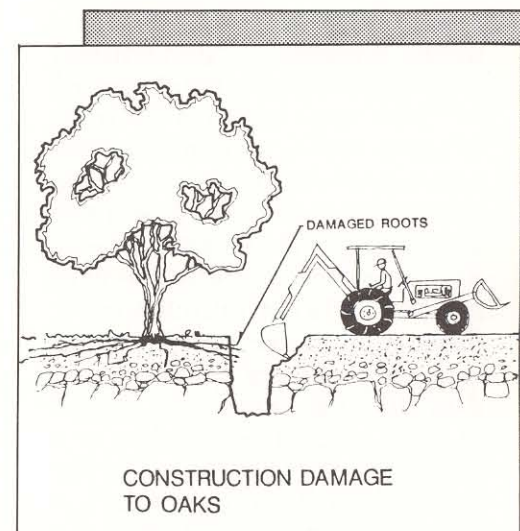
As stated, the natural environment of the oak has most likely been modified by grading for the residential lots within your subdivision. The watershed upon which the oak has so long been dependent has been replaced by your's

and your neighbor's lots. This is why, oaks in newly created urban settings will often rely on the homeowner for supplemental watering.

While it is not possible to delineate every condition when an oak tree will require watering we believe good common sense should prevail. If your oak tree is vigorous and thriving it will most likely not require supplemental watering.

On the other hand, if the leaf crown is thin and the seasonal elongation or tip growth of the small uppermost twigs is minimal, the chances are you should water the tree. We caution however, that a thin leaf crown with discolored leaves may be a sign of a disease organism at work. If you have doubt, seek professional help!

When to water your oak tree is of critical concern since many of the disease organisms which attack oak trees thrive in a wet environment. Diseases of oaks will be discussed later in this paper.



Coast Live Oaks follow an estivatory cycle in nature. This means that they are dormant (live but not growing) during the summer months. This can be observed with rapid leaf growth in the spring, little or no growth during the summer and rapid growth again in the early fall. Available water is most often plentiful in the spring, save for periods of drought, and less available during early fall. In periods of drought and in early fall your Coast Live Oak may require supplemental watering.

The Valley Oak is fully dormant (without leaves and not growing) in the winter, however, it follows the same pattern of foliage growth in spring and fall as the Coast Live Oak. This species desires more water than the Live Oak and is more stressed during drought periods. It is best that any supplemental watering take place during periods of leaf growth.

The best way to water your oak tree is by using a water probe which connects to your hose and is inserted into the ground, assuring positive penetration and efficient use of water. Some of these devices, such as a "Ross Rbot Feeder", have an attached chamber allowing you to fertilize as you water. It is important that you use the fertilizer cartridges as recommended by the manufacturer.

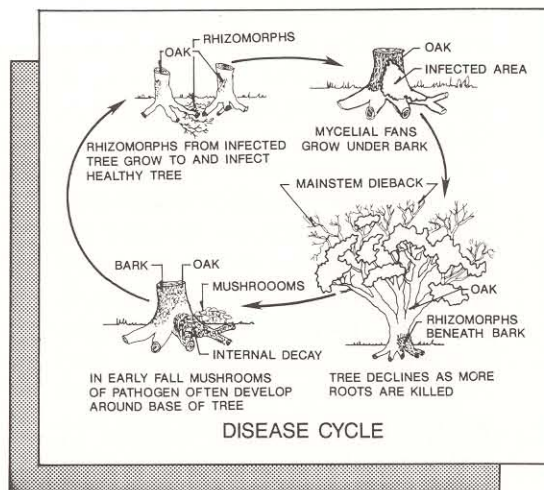
Generally speaking, 15-20 hours of low volume water application with a water probe, in numerous locations over the area at an just outside of the dripline of an oak, will be sufficient for one to two months. When repeating later applications different locations should be selected.

Winter rains can substitute for regular watering if they are heavy enough. Summer heat spells or hot winds may dry out the ground

to the point that more frequent watering will be necessary. This can best be avoided by allowing the trees own leaf litter to remain and build up beneath the tree as in nature.

It is important that sprinkler systems not throw water against an oak's trunk. Nor should water from adjacent plantings overthrow inside the dripline. This could saturate the soil and upset the delicate balance of oxygen and water which exists in the root zone and is necessary to respiration. Respiration is the process by which a plant absorbs and releases oxygen and carbon dioxide with the atmosphere.

The root crown of an oak, the point at which the tree trunk meets the ground surface, is the area where most predatory disease organisms gain access to the internal system of a tree. A continuously wet soil favors these organisms.



Therefore, it is important that the area inside the dripline of a mature oak *not be continually wet*. This condition sets the stage for an attack

by one or both of the most debilitating and often fatal root diseases; **Avacado Root Rot** (*Phytophthora cinnamoni*), and **Oak Root Fungus** (*Armillaria mellea*). Both of these organisms are present in the indigenous soils and possess the ability to penetrate healthy plant tissue without the prerequisite of a previous wound.

Changes in Grade

Any change in the level of soil around an oak tree can have a negative impact. No soil should be added or scraped away. Water should drain away from this area and not allowed to pond so that soil remains wet at the base.

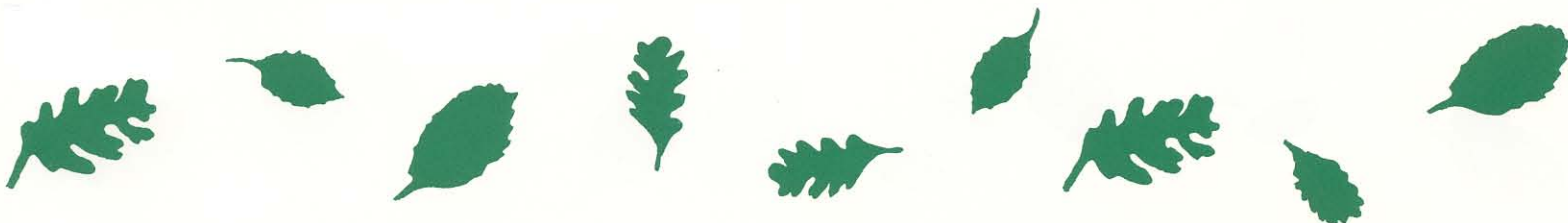
Retaining walls designed to hold back soil above or below an existing tree should be avoided if at all possible, especially within the protected zone. These types of structures cause critical areas at the dripline to be buried, or require that major roots be severed. Water trapped at the base of the tree could lead to root rot or other impacts, and to the decline and premature death of a highly valued landscape tree.

Construction activities outside the protected zone can have damaging impacts on existing trees. Underground water sources can be cut off due to falling water tables, or drainage may be disrupted.

Trenching

Digging of trenches in the root zone should be avoided. Roots may be cut or severely damaged, and the tree can be killed.

If trenches *must* be placed within the protected zone, utilities can be placed in a conduit which has been bored through the soil,



reducing damage to the roots. Insist that as many utilities as allowed be placed in a single trench, instead of the common practice of digging a separate trench for each individual line.

Trenching can also be accomplished using hand tools or small hand held power equipment to avoid cutting roots. Any roots exposed during this work should be covered with wet burlap and clear plastic sheeting and kept moist until the soil can be replaced.

Soil Compaction and Paving

The roots depend upon an important exchange of both water *and* air through the soil within the protected zone. Any kind of activity which compacts the soil in this area blocks this exchange and can have serious long term negative effects on the tree.

If paving material must be used, some recommended surfaces include brick paving with sand joints, or ground coverings such as wood chips (note the advantages of natural materials for providing nutrients under mulching).

Organic Mulching and Fertilizing

With the trees now dependent upon the homeowner, yearly feeding may be provided if needed, in February or March. Organic fertilizers would be preferable since they release slowly. The fertilizer may consist of cotton seed meal, blood meal, and/or processed sludge. In lieu of organic fertilizers, slow release commercial fertilizers can be substituted. **Exercise extreme caution when using inorganic commercial fertilizer.** Follow directions!

Coordinate fertilization with a periodic watering to dilute the fertilizer and make sure it soaks into the soil. Fertilization by soil injection with a device such as the "Ross Root Feeder" is advised.

The active, growing roots of your oak tree are inside the dripline and beyond, and here, is where the fertilizer is needed.

When ventilation of the root system is needed as well as fertilization, the use of sumps is advised. Hand dig twenty or more holes two feet deep and six inches in diameter. Place the holes in concentric circles with the trunk as the radius point. For best results, dig the holes two feet apart between the oak tree trunk, at the dripline, and dig others beyond the dripline.

Fill the holes with fifty percent "Kellogg's Nitrohumus" and fifty percent ammoniated redwood shavings.

This will supply an organic material similar to the oak leaf litter which will be decomposed by the soil micro-fauna producing a natural year-round source of fertilizer for the tree.

To the same hole, urea formaldehyde fertilizer should be added. It may be sold under any brand name, but it should have a guaranteed analysis of thirty-eight percent nitrogen.

A simple formula is helpful in estimating the number of pounds of 38-0-0 fertilizer to buy for your oak tree. First, estimate the diameter of the tree trunk thirty-six inches above the ground. Then apply two pounds of slow release urea formaldehyde per one inch of trunk diameter.

Example

Diameter of trunk = 36"
2 lbs. × 36" = 72 lbs.

The oak tree in the above example would require 72 lbs. of fertilizer per year. **USE CAUTION!** Over-fertilization of your oak could kill it or cause irreparable damage.

With careful periodic watering and once-a-year fertilizing, your oak tree should thrive.

Mulching

Water management should be exercised within the area inside of the dripline, as stated. As you would expect, if this ground is left bare weed growth will be encouraged. This condition is both unsightly and damaging to an oak in that weeds and forbs compete with the tree for available nutrients.

We recommend that you cover the ground beneath the tree canopy with a 3-4" layer of an organic matter such as walnut hulls (available locally) or fir bark (available at your local nursery). Add to this organic base every other year to compensate for the shrinkage. These materials have ornamental value and will keep the weed growth at a minimum while helping to minimize evaporation.

Pruning, disease and pest control complete the task of homeowner oak tree care.

Pruning

For the most part oak trees require little or no pruning other than periodic deadwooding. In fact, the pruning of green tissue increases the probability of disease organisms gaining entrance into a tree. To understand this principle, one must have a general knowledge of tree growth.



Each year a tree puts on a new ring at its outer circumference, just inside the bark. Dr. Alex Shigo, the most prominent Phytopathologist, has demonstrated that each new ring is in fact a new tree since the tissue which makes up this new ring is immune to disease that was previously present. Therefore, any wound to the green tissue of the tree works against the natural healing processes.

The particular way in which the tree separates the diseased tissue from the new tissue is known as "compartmentalization". The tree surrounds and encapsulates the diseased or wounded tissue to prevent advancement of the disease. When a wound occurs to the outer bark, exposing the woody area of the trunk, and the tree begins to close around this wound, Dr. Shigo refers to this as "closure".

This is a desirable condition. It can be observed along the edges of a trunk wound where a roll of tissue moves slowly inward towards the center of the wound. In the case of large trunk wounds, closure can be a very slow process taking in some cases, as much as twenty growing seasons.

The center or heart of a tree trunk or branch is normally dead tissue whose primary function is to provide resistive strength. Exposure of heartwood to the atmosphere invites invasion of Saprophytes (organisms which feed upon dead matter) and Pathogens (organisms capable of causing infection of living plant tissue). Open cavities normally follow the decay of heart wood creating inherent weakness. It is difficult for the tree to gain closure over an open cavity.

At closure the tree has controlled

the advancement of disease and has effectively closed the vascular system of the tree to entry by disease or insect vectors.

It follows then: if we are careful not to wound a tree by pruning we are preventing disease, and if a tree has been previously wounded we can effectively encourage the healing processes of the tree by maintaining it in a proper growing environment.

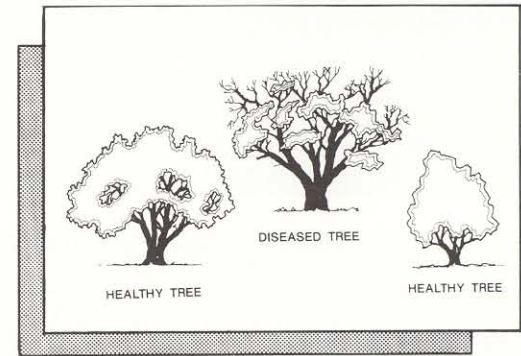
While pruning should be avoided whenever possible, it is important to employ good forestry practices. By this we mean, that good judgment, by **qualified professionals**, should be exercised to prevent major damage to the tree or property which might occur due to some dendrological defect such as weak crotches or loss of structure associated with heart rot.

In these cases pruning may be necessary. Controlled pruning damage, in most cases, is more desirable than uncontrolled damage which could occur if good forestry practices are not employed.

Disease and Pest Control

Successful pest control relies upon homeowners keeping a careful eye on the visual condition of their trees. If you notice that your tree is dropping too many leaves, has discolored yellow streaked leaves or bark, is oozing sap, has large open wounds, or has broken branches with the upper tips bare and dying back, it's time to get expert help.

Other signs of disease include small blotches of brown appearing in the overall green crown of your tree in midsummer, small holes bored in the trunk accompanied by sawdust, unusual growth, i.e., mistletoe, loss of vigor or general



wilting of the tree. If you see any of these symptoms, call a qualified tree surgeon.

The best protection from disease and insects is to keep trees healthy. Arrange to spray for "Twig Girdler" in April, May or June of two or three consecutive seasons.

Do not use weed killers or soil sterilants around the base of the oak tree or use chemical insect sprays without the advice of experts. The wrong sprays can kill beneficial soil micro-organisms and insects, or your tree.

During any construction or grading on your property, leave the ground under your trees undisturbed. Piling new soil within the dripline of an oak tree or cutting into the ground under it can smother the roots or injure them.

This letter and the enclosed details are a summary of the techniques and methods for oak tree care developed through many years of experience in the field. Obviously, there are no guarantees, even if the suggestions in this letter were strictly followed, that your tree will stay healthy and beautiful.

The methods of care for your oaks are uncomplicated; and with sensitivity, understanding and a personal commitment to do the best job possible to preserve these monuments to nature, the results should be rewarding.





OAK TREE ORDINANCE

It is important to note that oak trees within the City of Santa Clarita are protected. The moving, removal or encroachment by development, of an oak tree is not allowed without a permit.

Trees may be pruned, however. Wood to 6" in circumference (approximately 2" in diameter) may be pruned without a permit. Other than this minor pruning, you should contact the City's Community Development Department before pruning, removal, encroachment or modification of an Oak tree.

This paper was prepared by THE JAMES DEAN GROUP for the City of Santa Clarita as a public service and presents the recommendations and opinions of the author which have drawn upon twenty years of experience in the preservation of over 20,000 Oak Trees in the local area.