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motion studies for all of the activities involved in maintaining the parks: weeding, mowing, trimming, edging, etc. and compared our results to national averages," said Ferlita. Where the Tampa crews fell short of the average, changes were made in the methods or adjustments were made for the local climate differences.

Foreman roles have become much less physical and more managerial.

The study then broke down the tasks done by maintenance personnel in to 46 work activities to standardize the methods for each activity. The number of man hours required for each task was then computed. The standard methods were incorporated into a book of performance guidelines and given to the staff.

Each task was fed into the com-

puter with the amount of time and supplies it would take following the uniform method. The computer's job was to allot each job to one of the four district crews, the city-wide crew or the forestry crew.

Each month, the computer produces a stack of cards. On each card is one of the jobs slated to be done that month. The cards are sorted by district, delivered to the manager of each district and then delegated to the supervisors. Using the cards the supervisors must design two schedules for each of the crews under their jurisdiction. Once the biweekly schedules are approved by the deputy superintendents, the cards are further divided up among the crew foremen and the workers.

The men later report back how many jobs were finished and a monthly log is kept on how much the schedule is completed and how many man hours it actually takes. At the end of a year on the system, Ferlita and his staff will refer to these logs to update the accuracy of the data that the computer has to

work with, and make adjustments for the following year.

In theory, the system should run the Parks Department with robotic efficiency. But the human element has shown up in more ways than the sick days and vacation that are programmed into the computer.

Convincing employees to maintain grass, ornamentals and trees

It was hard to convince crews to stick to the computer schedule instead of handling work as they saw it.

from a schedule designed by a computer has been difficult in many cases. Ferlita has found that workers and foremen, many who have been in the department for 20-30 years, always devised their own schedules according to what they observed on a day to day basis, "It was hard to convince the foremen to stick to the new schedule, if

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they saw grass that needed to be cut, they cut it, regardless of whether it was a level three area and not to be cut for three months," said Ferlita. These activities seem conscientious, but they divert time away from completing items on the list.

Ferlita also found resistance to the increased paperwork for supervisors and foremen. Their roles have become much less physical and far more managerial. "We have been able to keep most of the people in the same jobs, but we have had to take people that have been with us for years and channel their thinking into a whole new pattern of planning ahead to write schedules, record what gets done, and keep a backlog of additional work to be done in extra time," explained Ferlita.

The Department has overcome many of its personnel problems by training the foremen and supervisors in the design and use of the system to clarify how their activities fit into the whole. Ferlita and

his deputies have found patience in this endeavor has paid off. Most employees needed more than one sitting through the training class on the system to fully understand it. As Ferlita explains, "it often hits like a bolt of lightning; after attending the same class two, sometimes three times, the picture finally comes together for them."

As the personnel problems in the field are ironed out, the system had has been showing some immediate benefits to the operation of the administrative offices. Requisitioning and inventory are now done through the computer. Records for materials and supplies use are kept, not only in terms of the quantities used, but also according to the jobs and crews by which they were used. The computer then automatically purchases general supplies according to the inventory levels.

Budgeting, which begins in May, is a much simplified process with the computer. As plans are made for the coming year the data from

the preceding year can easily be called up to document requests that may be questioned.

The Parks Department submits their finished budget to the mayor's office in mid July. "Now when we go to defend our budget, we're not arguing with estimations, its all there in black and white," said Ferlita. Although the final procedure is to submit the budget to the City Council in mid-August, in Tampa's strong mayoral government, the Council has very little power to revise and almost no option to veto the document that the mayor's office presents to them.

An evaluation of the management system will be made at the end of a full year. Ferlita is already aware of small changes that may have to be made but wants the system to run a complete year to get a consistent picture. At year's end, the monthly and quarterly reports of work finished will be pulled out and seriously compared to the original projections.

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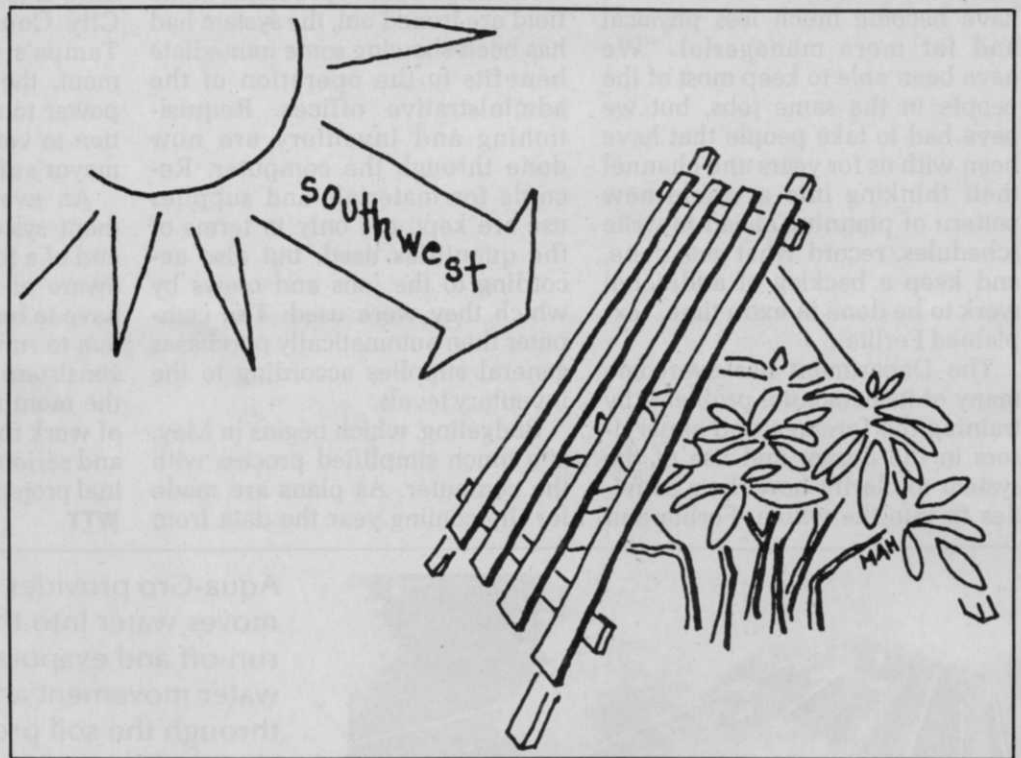
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COMBAT WINTER'S FURY WITH SIMPLE PRECAUTIONS

BY DOUGLAS CHAPMAN



Protect evergreen from excessive sun in mid to late winter.

Winter protection is a consideration of every horticulturist. When considering winter protection, we are trying to protect against desiccation (sun or wind induced), temperature fluctuation, salt, and rodent injury. We must all consider slight modifications or, if you will, precautions to the rigors of winter.

Desiccation or loss of water is most severe on evergreens but can also be a problem on newly transplanted deciduous trees, notwithstanding, any plant exposed to bright winter sun or severe southwest winds. This extreme loss of water or death due to loss of water is often called sun scald or southwest injury. Essentially, one should try to protect evergreens from excessive sun mid to late winter (February-March). This protection can be nothing more than a bushel basket or snow fence

on the south or southwest sides of plants or correct companion plants, e.g. rhododendrons under pines. The key to protecting against this type of injury is to slow the drying late winter or early spring winds. Further, it is important to insure there is sufficient moisture so that when the soil does warm up, water is quickly replenished to the plant. Although structures are often used, branches from pruning, discarded Christmas trees, burlap, etc. will do an effective job.

Sun scald is another form of death of plant tissue due to drying sun. Often, as in wind burn, we see it on the south to southwest side of the plant. This is essentially desiccation of evergreens, that is the sun warming the foliage, thus allowing transpiration to occur while having a root system frozen and, thus, not active. Similar structures as men-

tioned above are used to protect or shade plants. Further, companion plants, such as yews—spruce, rhododendrons—pine, oak—azalea, are effective. Lastly, many plants are tolerant or resistant to wind burn, e.g. Norway Spruce, White Spruce, and many of the junipers. In fact, these plants can be used to protect more tender plant material, e.g. yews, rhododendrons, *Acer palmatum*. Companion planting or protection of tender plants is critical to winter survival.

Wide temperature fluctuation in a short period of time is considered more damaging than high or low temperature extremes. Many plants are capable of withstanding

Douglas J. Chapman is a Horticulturist at Dow Gardens, Midland, Michigan

temperatures of 20 to 30 degrees below zero, e.g. *Rhododendron catawbiense*, *R. maximum*, *Acer griseum*, *Koelreutaria paniculata*, but a few will tolerate 30 to 50 degree temperature fluctuation in one day. Several ways to protect against rapid fluctuation include protection of tender plants (giving a north to northeast exposure) and mulching.

Desiccation is most severe on evergreens, but can also damage newly transplanted deciduous trees.

Mulching for winter protection is under utilized. Many of us in the landscape perceive mulches as an opportunity to conserve moisture and reduce competition due to weeds, but these same mulches are particularly effective insulators and, therefore, reduce temperature fluctuation. Several of the best mulches are organic, e.g. wood chips, bark, peat moss, compost. These materials not only reduce maintenance but help the soil stay colder longer, if you will, warm up slower in the spring. Further, they conserve moisture by reducing competition and evaporation—again, an opportunity to integrate year-round maintenance with a unique consideration—"winter protection." If organic mulches are used, they also help improve the tilth of the soil and encourage plant survival.

Application of sodium chloride, or salt, can be one of the most single devastating practices to the landscape. Many native plants are intolerant of chlorides. Dirr in Illinois did some classic research showing that chloride was, in fact, the harmful element and that some plants are considered more sensitive. One of the outstanding lists revealing sensitive and insensitive plants to chloride was written by Harold Davidson of Michigan State University. His literature review showed clearly that some plants are intolerant to chloride

TABLE 1

CHLORIDE TOLERANT	CHLORIDE INTOLERANT, SOILS	CHLORIDE INTOLERANT TO FOLIAGE
<i>Acer campestre</i>	<i>Crataegus</i> sp.	<i>Acer ginnala</i>
<i>A. platanoides</i>	<i>Gleditsia triacanthos inermis</i>	<i>A. palmatum</i>
<i>A. rubrum</i> (spray)	<i>Picea pungens</i>	<i>Amelanchier</i> sp.
<i>A. saccharum</i>		
<i>Aesculus hippocastanum</i>		
<i>Alnus glutinosa</i>		
<i>Betula papyrifera</i>		
<i>Juniperus virginiana</i>		
<i>Malus</i> sp.		
<i>Pinus nigra</i>		
<i>Quercus macrocarpa</i>		

applied to the soil and/or foliage.

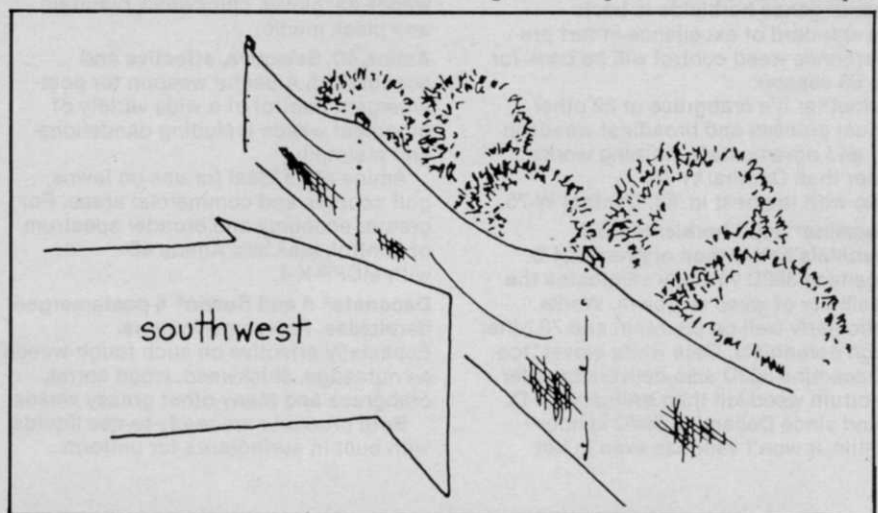
One must build structures around intolerant plants, e.g. burlap, to protect against chloride drift on foliage or branches.

Rodents, specifically mice and rabbits, can raise havoc in the garden. Rodent guards, such as wire mesh or plastic collars that surround the tree trunk, remain the best protection. Rodent guards should be put on prior to the end of November or the initial freezing. One-quarter inch wire mesh or hardware cloth should surround the trunk at the base up to 18 inches if possible. One often sees different rodenticides or poison baits being offered as a major control mechanism, but for public landscapes, e.g. corporation grounds, arboreta, or parks, the increased liability or chance of someone being hurt, precludes the use of these materials. If one is looking for biological control possibilities, having one in-house cat per 10 to 15 acres might be ideal. If this is impractical, rodent guards

fill the needs.

Deer can be devastating to the landscape. They not only chew on plants in the *rosaceae* family, e.g. crab apple, cotoneaster, but *Eunonymus vegetus* and yews are particularly attractive, in fact, seem to be preferred food. There are several repellants that can be used in an effort to reduce deer damage. They include bone tar oil, Thiram, and a new trade-marked product, called Hinder. It must be stressed, though, that these are only repellants and, if the deer are under stress, they will still eat through repellants. Further, if you are in a heavily populated deer area, the growing of tulips can be extremely difficult and one may want to consider substituting daffodils, as they are a non-preferred food.

Winter protection is important and can be accomplished through companion plantings, correct exposure, or mulching. Further, rodents and other animals can have a negative impact in the landscape.



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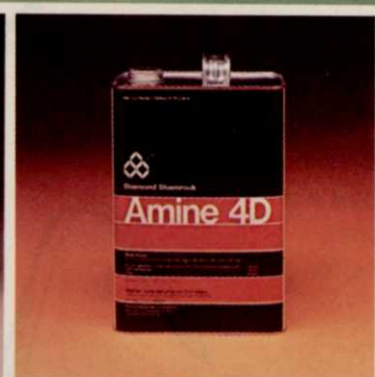
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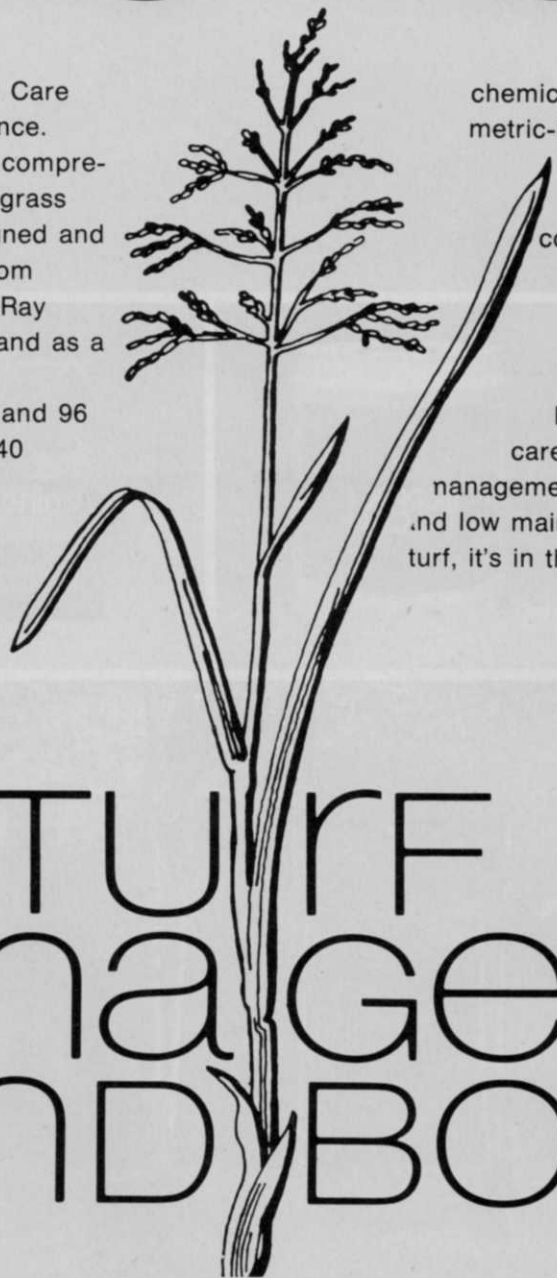
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