

weather to keep satisfactory color. Second, if possible, raise the mowing height during this season but retain the same mowing frequency. Third, do not apply herbicides or other chemicals (fungicides excepted) which may damage either top or root system at this time. Finally, control water as much as possible to avoid having a saturated soil but at the same time prevent wilting. It should be quite obvious that turf disaster may result at this time from anything which will damage the root or crown of the plant.

#### Warm Season Grasses

Warm season grasses, particularly Bermudas, do not exhibit the differential response to temperature such as cool season grasses. Minimum, optimum, and maxi-mum temperatures for root development closely parallel those for top growth. Similarly, food reserves continue to be built up during periods of high temperature. Both food reserves and rot development appear to be affected less by mowing than in the case of cool season grasses.

We have some interesting temperature problems with these grasses, however. These are in respect to low temperatures. It is a common observation that as temper-



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atures drop in the fall, growth of Bermudas ceases and eventually the turf discolors even though freezing weather has not been experienced. We have found that the minimum temperature for growth of Bermuda is approximately 50 degs. F. But growth will continue at even much lower night temperatures provided day temperatures are sufficiently high — 70 or above. Some improved strains, Ormond and Tifgreen, for example, appear to have a somewhat lower minimum growing temperature. Zoysiagrasses have an even higher minimum — approximately 60 degs. for Meyer and around 55 for Emerald and Matrella.

#### Light Intensity Factor

Discoloration or winter dormancy of these grasses is an interesting reaction to climatic factors. It is generally assumed that this is caused by temperatures between 30 and 40. However, this is only partly true as we have kept U-3 Bermuda alive and green at a constant 34 for over a month. This would indicate that another factor is involved in discoloration. We have found that this factor is light intensity. The plants held at 34 without discoloration were under artificial lights of low intensity. When plants are exposed to high intensity, light comparable to natural sunlight in conjunction with temperatures of approximately 45 or less, typical winter discoloration develops. Low temperature and high light intensity interact to destroy the chlorophyll (the green coloring material in plants) and at the same time to prevent the synthesis of new chlorophyll. However, if day temperatures are approximately 70 or above, discoloration will not develop even though night temperatures are just above freezing. Of course, freezing temperatures will stop all growth and bring about discoloration because of tissue destruction and disruption of physiological processes.

Discoloration of Meyer Zoysia occurs at slightly higher temperatures and lower light intensities than for Bermuda. Emerald and Matrella Zoysia are more comparable to Bermuda.

Application of soluble nitrate, ammonia, or urea nitrogen in the fall will prolong the period of green color and will cause earlier greening in the spring. How nitrogen functions in relationship to temperature and light to do this is not known.

Golfdom

# Close Cooperation in Use of Cars

### By MEL WARNECKE Supt., East Lake CC, Atlanta

At East Lake in Atlanta we have about 85 golf cars. We have given a lot of thought to the proper routing of cars to prevent wear of the courses. There is close cooperation between Harold Sargent, our pro, and myself as to the use of the cars during periods of wet or poor weather. Whether or not the cars are to be used on any given day is left entirely to my judgment. The car subject, as we all know, is a touchy one and when the supt. shuts off the vehicles, he is a rather unpopular man.

I have found that upon notifying the



golf shop, Sargent or his assistants always take time to explain to members why use of the cars on a particular day may cause serious turf damage.

#### Attend Greens Meetings

Our green committee meetings are held regularly twice a month. Jim Fischer, our club mgr., and Sargent attend these meetings. Fischer often acts as our secretary. Thus all department heads are kept well informed of all course operations, whether they are general maintenance practices or improvement or rebuilding projects.

The club mgr. is a sort of shock absorber between the pro, supt., members and the board. He must be informed at all times on club policies, the wishes of the committees and the progress made in various operations inside and outside the clubhouse. His familiarity with the needs of the maintenance dept. can enable him to help us in discussions with individual directors and when these matters come up for discussion at board meetings. The pro dept. also depends on him. Thus, when the three of us present a solid front when presenting our recommendations, I am sure they carry much more weight with those who make the final decisions.

Closer contact by the superintendent

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Dealer inquiries invited. Borg Warner Corporation INGERSOLL KALAMAZOO DIVISION 705 Iou Vis Deak, Richigan, Frieghese Fireide 2-0136 with both professional and mgr. makes all aware of the work and what it takes to keep a course in good condition. Unfortunately, many of these men have no idea of the extent and scope of a supt's knowledge and what goes into the maintenance of a good course. In this way, also, the pro can act as a go-between between golfers and the maintenance dept.

#### Superintendent Should Play

I have always thought it most important for the supt. to play his course as often as possible in order to get the players' viewpoint. I think a golf game with the pronow and then, and perhaps a pro-supt. tournament once a year promotes needed harmony. Also, attendance of the mgr. and pro at an occasional meeting of the local turf associations enables them to get a better concept of work being done in the turf field.

I feel that the need for cooperation between the three dept. heads is greater today than ever before with labor and material costs being what they are. This cooperation will help provide the membership with a better organized club, both in services rendered by the mgr. and pro. and in a more playable course.

# Closely Examine All Elements of the Job

By J. M. MAC KENZIE Manager, Institutional Engineering, Toro Manufacturing Corp.

One way to study jobs to reduce the time and effort put into them is to sort their elements into productive and nonproductive work. Perhaps many times sizeable amounts can be eliminated by challenging the entire job or its parts. For example, is it necessary to trim or rake as often as is specified? Can trap raking be completely eliminated or should it be left up to the players? There are many questions such as these that should be asked.

If it is decided that a certain job has to be done, ways should be found in which it is to be done most effectively. Obviously, the first thing to do is to assign it to the employee who does it best. A major part of a supt's success depends on planning, seeing that plans are carried out, and then re-planning to correct errors between plan and action or plan and needs. Delegating authority and responsibility



comes under the head of planning. If the supt. has 10 employees, less and less time is available to him for making plans. If he has 20 people under him, it is further reduced. With either number he owes it to himself and to the club to train assistants to relieve him of the task of making hourly decisions. This gives him more or sufficient time to do his planning and, even more important, provides for continued operation of his dept. when he is away due to vacation, illness, etc.

#### Special Training

Some of the projects in the annual plan, or provided for in the budget, can be carried out by one team of employees. Quite a few of these jobs require special skills. The supt. should give more than passing thought to these assignments and the qualifications and training necessary for the employee or teams of employees to handle them. Careful selection in this respect can produce superior results.

Supervision is justified only insofar as it helps the man who is doing the work. A good supervisor must know what he wants done, tell his men what he wants done and help them do it in the easiest possible way. He must forget his feelings of position and pride to make it possible for the man he supervises to increase his output to the extent that it helps pay the added cost of the supervisor's salary.

#### Measurement of Performance

The effectiveness of management can be measured in some areas, and comparatively judged in others. Performance can be measured financially against the bud-



get; quality of effort by the total annual compliments or complaints. (Has any supt. ever kept a close record of these? It might be interesting to do so.) The effectiveness of the employees' work can be judged by time standards, but quality only by close personal examination by the supt. He must have definite and preconceived ideas of the kind of quality he wants.

At least twice a year the employee should be brought up to date on his performance. If his work is satisfactory, telling him so not only encourages him but helps to bring even greater improvement.



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If it is below standard, he'll never improve unless the supt. tells him that improvement is expected.

#### Assistance Not Dominance

Management is a function of assistance rather than dominance. Recognition of good work redounds to the benefit of the supt. In most cases, constructive criticism of poor or only average performance can also work to the advantage of the supervisor.

A full manhour of work can be realized only through the courtesy of a sensitive human being. Each employee has feelings of love, hate, happiness, sorrow, pride, shame, security and uncertainty. One management consultant sums up a basic tenet for supervisory employees in the words: "The most insulting and dangerous thing you can do to another person is to disregard him as if he didn't exist. If you can't say 'good morning' to the fellow who works for you, then you are taking money out of your own pocket." Call your employees by name and learn a little something about each of them. Discuss their problems with them if necessary.

You rise or fall because of your employees. Treat them with dignity and tact and they will help you carry out your plans more perfectly than you ever dared to expect.

# Sand, Clay, Organic in Green Mixture

#### By MORRIS E. BLOODWORTH Associate Professor of Agronomy,

Texas A & M College

Until a few years ago there appeared to be no exact solution to the compaction problem. But recent research by H. L. Howard, R. J. Kunsze, O. R. Lunt and others indicates that compaction can be greatly reduced if proper consideration is given to individual soil mixture ingredients.

In mixtures for greens, sand, clay and organic fractions, of course, are basic. There are many variables involved in de-

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termining what combinations of these give the best results.

As for sand, research at Texas A & M shows that a regular washed, mortar brick sand, from 1 to .1 mm in dia. is desirable. Optimum size is .5 mm. Sizes smaller than .1 mm tend to compact and impair internal drainage. Fractions greater than 1 mm lower the soil's water retention ability, resulting in leaching of nutrients, and, of course, less available water. Larger sizes of sand also don't provide firm footing.

Sand percentage composition that appears to give very good results is around 80. This may seem high, yet many sandy loam soils now found in greens contain from 60 to 75 per cent sand. Indications are that something near the optimum size grain (.5 mm) rather than the percentage cited above is perhaps more critical. But the .5 mm- 80 per cent proportion, mixed with correct proportions of clay and organic material, should provide a most desirable green mixture.

#### Clay Most Important

Clay, which has been indicated to be the active fraction of the soil, is the most important component of the green mixture. The optimum size fraction is .002 mm (2 microns) and smaller. It is responsible for supplying plants with nutrients, often controls water availability and determines drainage characteristics to a rather large



extent. The three general types of clay are montmorillonite, illite and haolimite. There is a wide difference in their physical and chemical characteristics and understanding of this is essential before deciding upon a suitable sand-soil mixture. Montmorillonite has tremendous swelling and shrinking characteristics and is extremely plastic when wet. Because of their crystalline structure, the other two types of clay do not have these characteristics.

The amount of clay for a desirable green





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Golf Day . June 11th

mixture should range between 4 and 10 per cent, according to H. L. Howard. About 4 to 6 per cent of montmorillonite appears to be correct. According to Howard, it is preferable to haolimite and illite but this is not final. It should be emphasized that the silt content should be kept to a minimum since the silt fraction often contributes to the problems of compaction and poor interior drainage.

#### Use of Peat

There remains about 10 per cent organic material (peat) to be added. W. L. Garman of Oklahoma State University has found that more than 20 per cent peat by volume is detrimental to the putting mixture. Thorough mixing of the three components is a must.

Although peat is an old standby, consideration should be given to certain synthetics and other new materials now available. They may be more desirable than peat in some cases and certainly warrant testing both in the lab and in the field.

### Frank H. Goldthwaite Dies in Ft. Worth Home

Frank H. Goldthwaite, 52, who founded the Texas Toro Co. upon graduation from college in 1928, suffered a fatal heart



attack in his home in Ft. Worth on Feb. 28. Joined by his brother, Howard, in 1929, Mr. Goldthwaite covered the Southwest in the early years after the company's organization selling mowing equipment, sprinklers, fertilizers and turf supplies. He worked out of Ft. Worth until after

World War II and then opened divisions in Houston, Dallas and San Antonio, the latter in 1958.

A strong believer in education, Frank helped establish the Texas Turfgrass Assn. in 1947 and sponsored scholarships at Texas A & M and Texas Tech in turf management. He was a member of the GCSA and a dir. of the O. J. Noer turf research foundation.

Mr. Goldthwaite is survived by his wife, Aniela, who will operate the Texas Toro divs. as pres. of the company, two daughters, Mrs. Hugh Pitts and Frances, and a son, Frank, Jr.

### Metropolitan Car Report

(Continued from page 33)

complete supervision of such matters. Cars are given the full range of the course (except for tees, greens and hazards) at approximately 75 per cent of the clubs that answered this section of the questionnaire. At about 55 per cent of the clubs, routes and limits are defined and they generally cover distance from greens and hazards, parking areas in the vicinity of tees and prohibited areas. Distance from greens at these clubs range from 15 to 60 ft. and from hazards, 10 to 30 ft.

Instructions have been issued at 15 clubs as to speed, sharp turns, handling on hills, etc., while 22 clubs said they have not issued such instructions.

#### Special Construction

One of three clubs reporting on special construtcion required to accommodate cars, said that they have widened and strengthened bridges, cleared scrub growth to make continuous paths, graded and surfaced hilly routes or paved or resurfaced areas for parking. The cost of making these improvements generally was reported as "negligible" or "reasonable.

Almost 90 per cent of the clubs that permit cars have year-around storage. Amortization of costs of building garages and providing electric charging equipment has been borne by 29 clubs; members financed these facilities in nine instances, the pro in two, a rental agency in one, and in one case they were donated by a member. Write-offs, where clubs own cars, are handled as a percentage of income from rentals, by a depreciation charge or a general writeoff. Garage construction costs per car were around \$350 but there was no firm figures established for wiring and charger installations.

Rental income fluctuated quite widely. There is no true indication that a large fleet of cars will return a profit and a small fleet, a loss, the survey shows. One club noted that it is not in the rental business "to make a profit."

#### Here to Stay

Clubs that already permit cars, according to the MGA survey, are almost unanimous in pointing out that once they are introduced they are "here to stay." Seven of 35 clubs feel that car ownership should be vested in the club; 14 prefer to have the vehicles owned



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by members; 10 think they should be the property of a rental agency; and four would have the pro owning and running the car concession.

Under a section, "Effect of Car Usage on Caddies," 23 of 27 clubs say that golf cars haven't resulted in a dropoff in the number of bag carriers employed. Twenty-one clubs feel that caddie morale hasn't been affected by the advent of the vehicles while two say that it has. Caddiemasters at seven clubs approve the use of car as compared to five who don't.

More than 60 per cent of the clubs feel that proper etiquet is completely observed by drivers and 75 per cent report that their drivers are 100 per cent conscientious.

As for the supt. who has been regarded as somewhat unreconstructed in the matter of cars, the MGA survey reports the following: Fifty per cent of the greensmen feel that cars should have free run of the course (tees, greens, hazards excepted, of course); nine of 16 would confine the vehicles to the rough; four of 10 would have marked routes; and 14 of 16 would bar cars from certain areas.

Most damage, according to the supts., seems to be done to the rough and aprons, although green approaches, low fairway areas and bottleneck areas also are mentioned. Compaction, rutting, tire tracks, grass tears and general wear are cited as nature of damage. About 90 per cent of the supts. who committed themselves as to whether damage generally is repairable said "Yes," but about 50 per cent of those to whom this guestion was submitted made no comment. Ten of 22 supts. think there can be long run serious damage caused by cars; four don't think so; one said he did not know; and seven did not comment.

Some typical comments by supts. follow: "Cars are no problem when drivers are educated and the supt. is allowed to make the decision as to car use;"

"We'll have to do much more aerifying to check compaction;"

"Cars increase play, especially in hot weather . . . They also speed up play but it is more difficult for maintenance workers to keep out of their way."

