THERE are many ways in which design of the golf course may affect the cost of maintenance. Because of present-day labor costs, the golf course architect must use all the methods available to him to eliminate tedious time consuming maintenance tasks.

To take the golf course features in order, we may start with tees. Tees should be large. The elevated area should be made to blend into surrounding terrain by means of long gentle slopes. Corners and sharp breaks in contour are to be avoided. These considerations affect the ease of maintaining tees with the larger units of power equipment and permit the use of such equipment without a danger of scalping. Tees should be long (generally more than 100 feet) to permit flexibility in the length of the hole and to permit frequent rotation of tee markers.

Fairway bunkers are the next item in our progress around the course. Those bunkers which do not affect the strategy of play and those which penalize the high handicap golfer should be eliminated. Fairway bunkers should be built so that the sand is visible, so that they will be well-drained and so that slopes will be gentle. It is easier to maintain the areas surrounding bunkers if the edges are smooth rather than scalloped.

With reference to putting greens, one of the most important factors is to have the green large enough to provide plenty of space for setting the cup. Cup locations need to be changed frequently. Traffic around the green is a serious matter and design can be used to minimize this problem. Carts and golf buggies are coming into greater use and it is difficult to avoid concentration of traffic from this source.

Bunkers around putting greens should be far enough from the putting surface to allow for passage of fairway mowing...
equipment between the bunker and the green. Greens can be shaped so that bunkers will be relatively near the hole even though there is room for mowing units to pass between the bunker and the green.

Plant materials should be used judiciously on the golf course to prevent their interference with maintenance. Trees should be spaced so that there is not a necessity for the use of small mowing units. Shrubs probably should not be used on the golf course. Their place is around the clubhouse. Golf balls cannot be played from beneath shrubs and they invariably constitute a difficult maintenance problem.

**Technical Advances Which May Counteract Unnecessary Maintenance Costs**

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**Technical** advances have had profound effects upon the quality of turf and upon the cost of maintenance. Better grasses have been uncovered, management procedures have been simplified, and costs have been reduced, in some instances.

At one time grubs of the Japanese beetle threatened complete destruction of turf in the Philadelphia area. Control with carbon disulfide was tried first. It killed the grubs, but turf damage from its use was worse than from the grubs. The USGA Green Section induced the United States Department of Agriculture to attack the problem. Leach got the assignment and promptly developed the lead arsenate method of grub-proofing turf. He pointed out other virtues of lead arsenate usage—such as worm cast control and the marked reduction in weeds, notably crabgrass and chickweed. Then chlordane displaced lead arsenate. It killed grubs quicker and more effectively and solved the ant problem. An over-all spray gave better control and was cheaper than the old method of poisoning each ant hill by hand.

This is but one instance of a case where applied research saved the day and in doing so provided other important benefits including a better and cheaper way to control ants.

Even more startling advances are in prospect because of intensified research by the various experiment stations. Research workers are the true missionaries in the turf field. Besides finding the answers to immediate practical problems, it is their task to delve into the realm of the unknown. As a result of such research the impossible of today becomes the commonplace of tomorrow.

The problem of translating research into practice must be faced by the superintendent. You must separate the wheat from the chaff. In most instances it is a simple matter. To put any proposal of a revolutionary nature into large scale use immediately is unwise. Field testing first, followed by pilot scale use is the wise procedure. It is the way to acquire the know-how to do the job, and to uncover any weaknesses in the method. Some can be corrected, but others may nullify what seemed like a desirable change.

The same kind of approach should be used by outside advisory agencies. The money spent is not their own. They must be sure of their ground when offering a positive recommendation, and must be prepared to defend the program.

Budgets for course maintenance have not been out of line. They have been within reason, mostly too low rather than too high. Any attempt to make a moderate or drastic cut will be bad for the turf. Economy-minded officials have made slashes before. Turf deterioration occurs gradually, especially where there has been a high standard of maintenance. The economists have their day for several years. After the day of reckoning, the cost of rehabilitation is more than would have been spent to keep the course in good playing condition.

The golf course is no place to waste or to save money. It is important to provide those things which make the golf course