It can and should teach such things as honesty, dependability, proper appearance, proper language, and how to work well with others. Example can also teach interest in and concern for others. What better way for a person to learn good work habits and good work ethics, than by the example of his boss? The best employer I ever had taught me I didn't have to ask him what to do. I soon learned his answer would be, "What is right, what is fair."

Management by supervision is often difficult for a person who is a hard-working do-it-yourselfer. This method requires delegation, and to delegate properly takes considerable effort. Giving someone a job, making sure he knows how to do it, permitting him the freedom and authority to accomplish it, and supervising when needed but not interfering, is proper delegation. Note that this does not mean abdication of responsibility or supervision if needed. Delegating everything and doing nothing is back to management by default. There is a line between the two, and one must be careful to note that line. Top executives generally use a combination of management by supervision and delegation. Running a club properly also requires a combination: that of management by example and management by supervision, including delegation.

AS A CLUB manager for many years before becoming a general manager, I found that managing was unquestionably much easier and things ran smoother when I was a general manager. Why? The golf course superintendent and I spent many hours considering this. We came to the conclusion that a general manager did make things easier for both men if both would assume their proper roles. For either a club manager or superintendent to act independently of the other will undoubtedly cause nothing but chaos. The superintendent has to be the authority regarding the golf course. He knows it, and he runs it. The superintendent, with the general manager, budget and approve spending. The general manager can remove many problems that come with committees and committeemen. He can attend some of the time-consuming meetings and leave the superintendent more free to run his course and his crew. By the manager and superintendent working together, each cognizant of the other's needs, both can be successful executives in their respective fields. The general manager has to understand this role and not interfere with the superintendent.

Regardless of whether the club has a general manager or is trying to function with three heads, someone has to assume the responsibility of coordinating everything with board members and committees. It is their club, they are the representatives of the membership who pay the bills and they unquestionably have the final say. One problem is that they are ever-changing and the business where they have been successful influences their thinking and actions. This can be most frustrating at times, and it becomes necessary to educate each new man every year. The most successful club managers and superintendents I know set up specific appointments early in each new year to meet with the new committeemen, go over financial matters in detail, review problem areas in the operation, cover the long-range projects, and most of all give each man a detailed extended tour of the entire plant and its operation. If this is done, and each new individual is asked for ideas and suggestions and honestly comes to feel his help is desired, you will find that the biggest problem is solved.

Obviously this has barely scratched the surface of management techniques. From my experience, the following list of suggestions can be most helpful.

Give Credit Where Credit is Due: Taking credit for another's ideas or work is dishonest. More than this, it destroys initiative and loyalty. Building others up will automatically build you.

Don't Be Afraid of Change: Everyone is for progress but some are afraid of change. Keep new ideas flowing. Continually propose changes and improvements. If only a small percentage of your suggestions are accepted, it is good. By keeping the boards and committees so busy with new ideas, the superintendent and manager can direct their energies productively.

You Determine the Atmosphere Around You: This doesn't mean you have to wear a perpetual grin, but no one likes to be around a grouch. Pleasant surroundings and a pleasant atmosphere attract pleasant people.

Work Well With Others: More people are fired or held back for lack of this quality than any other. I lost the best job I ever had because I overlooked this. A smooth-running organization is fun to run.

You Are Good or Bad by Comparison: The best is the best because he is better than anyone else. If you are only the best of the worst, you still aren't good.

Lead the Way: Don't be afraid to pay the highest wages — if they are justified. Be proud to have others look up to you as the leader. Success attracts the best of everything.

A capable, qualified manager is almost priceless. The wonderful thing is that we can all become better managers if we are willing to put forth the effort.

Growth of Bentgrass as Affected by Nitrogen, Soil pH and Age of Stand

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OUR STUDY WAS DESIGNED to evaluate the growth of Penncross creeping bentgrass as affected by soil pH and thatch-mat accumulation under different rates of different nitrogen sources.

How efficiently creeping bentgrass plants absorb nitrogen from the soil, and how efficiently they use nitrogen fertilizer has been studied under northern conditions where growth occurs only during the warmer seasons of the year. In the Southwest, in contrast, bentgrass grows the year around; it grows best during the cool season. Heat stress in mid-summer is a severe problem. A seasonal pattern of root decline from summer heat stress is common to both regions, but it is accentuated in the Southwest and affected more by nitrogen excess.

Creeping bentgrass is best adapted to slightly acid soil (pH 6.0 - 6.8). Typical Southwestern desert soils range from 7.5 to 8.5, and some sands used in green construction may have pH values above 8.0.

Bentgrass growth is also affected by thatch and mat. If too much thatch is present, roots tend to be restricted to the organic layer and have little contact with the soil below. In addition, the organic layer of mat and thatch has a high cation exchange capacity and a high nitrogen demand from microorganisms living in it, restricting immediate availability of nitrogen to the grass and affecting the fate of the nitrogen that has been applied.

The study was done on a green that was constructed in 1970 with 12 inches of washed mortar sand laid over two inches of washed concrete sand that, in turn, was laid over four inches of washed pea gravel. The green was seeded to Penncross creeping bentgrass in December, 1970. In 1974, tile lines were installed in the subsurface soil by using a sod cutter to remove the turf, installing the tile, backfilling with washed mortar sand to grade, and reseeding with Penncross bentgrass.

Early in 1977, a series of plots was cut from the original green, and the top 10 inches of sand was removed. New mortar sand was then added to grade, and acid washed sand was applied to half of each plot, providing a pH of 6.5 on one-half and 8.2 on the other. These plots were then seeded with Penncross bentgrass. By following this procedure, we had established bentgrass of three ages available for testing and, hence, three levels of thatch-mat accumulation, plus two pH levels in the youngest stands. Four nitrogen fertilizers at four rates were applied to the different aged plots. Initial applications were made in October, 1977. The nitrogen sources were: ammonium sulfate (21% nitrogen), urea (46% nitrogen), sulfur-coated urea (38% nitrogen), and isobutylidene urea (IBDU — 31% nitrogen). Fertilizers were applied each October and November and again from February through April. Applications were equivalent to 0, ¼, ½, and 1 pound of actual nitrogen per 1,000 square feet every two weeks, with ammonium sulfate and urea applied at that frequency. The sulfur-coated urea and IBDU were applied every eight weeks. All possible combinations of these differential treatments were included in each of two replicates, providing a total of 128 plots; 64 plots in each replicate. Plot sizes were 2½ x 7 feet, with the 1977 plots further split into 2½ x 3½ feet by the pH differential.

EACH PLOT was regularly rated for quality on a score of 1 to 9, with 9 best. Ratings were independently made by each of three individuals, and their scores were averaged. In addition, clippings were analyzed for chlorophyll content, and root measurements were made from plugs. Ratings were made in May and June, 1978; January, February, April, and November, 1979; and January, 1980. Chlorophyll content was determined from samples taken in April and November, 1979. Root measurements were made in August and December, 1979.

Data obtained are summarized in *Tables 1-3*. Turf quality increased with nitrogen level and stand age, as might be expected. Plots treated with sulfur-coated urea and IBDU fertilizers were consistently lower in quality than those treated with ammonium sulfate, and they were usually less so than those receiving urea. An important factor in lowered quality with the sulfur-coated urea was the fact that granule size of the material available to us was too large to be used on greens. Many pellets were cut by the mower because they had not worked down into

TABLE 1.
Average Turf Quality Ratings (1-9-9 Best) 5/3/78 - 1/28/80 for Penncross Creeping Bentgrass as Affected by N Rates, N Sources, and Age of Stand.

N Rates (lb/1,000 ft²/2 weeks)	0	¼	½	1
Quality ratings[1]	2.9a	5.3b	6.4c	7.0d
Nitrogen sources	IBDU	SCU	U	AS
Quality ratings[1]	5.0a	5.0a	5.6b	6.0c
Year stand established	1977	1974	1970	
Quality ratings[1]	4.8a	5.8b	6.0b	

[1]Statistical analysis indicates odds of 19:1 or better that differences between values with different letters would not occur by chance.

TABLE 2.
Average Chlorophyll Content (ppm) of Clippings Sampled in April and November, 1979, as Affected by N Levels, N Sources, and Age of Stand.

N levels (lb/1,000 ft²/2 weeks)	0	¼	½	1
Chlorophyll content	3.6a	4.8b	6.0c	6.4d
Nitrogen sources	IBDU	AS	SCU	U
Chlorophyll content	4.4a	4.8b	5.3b	6.1c
Year stand established	1977	1974	1970	
Chlorophyll content	4.7a	5.3b	5.5b	

TABLE 3.
Average Root Lengths in mm (25.4 mm = 1 inch) for Plugs Taken in August and December, 1979, as Affected by N Levels, N Sources, and Age of Stand.

N levels (lb/1,000ft²/2 weeks)	0	¼	½	1
Root length	107a	101a	92b	87b
Nitrogen sources	IBDU	U	AS	SCU
Root length	94a	94a	96a	102a
Year stand established	1977	1974	1970	
Root length	105a	92b	77c	

the grass. Wherever pellets were cut, the nitrogen was released, and this created an unattractive set of green polkadots. Nitrogen released by the IBDU under our conditions appeared variable, varying from little to too much. During the summer of 1978, the highest two levels of IBDU application apparently released excess nitrogen, burning back the plots and providing only limited recovery in quality later.

Acidifying the sand used to establish the 1977 plots significantly increased turfgrass quality, raising the average rating from 4.8 to 5.1. However, quality ratings of the two older plot series were significantly above 5.1 at 5.8 and 6.0.

Quality ratings were subjective evaluations considering density, texture, apparent vigor, and putting quality, as well as color. Chlorophyll analyses should be a means of quantitatively expressing color, with high chlorophyll values suggesting darker green. The values in *Table 2* show that adding nitrogen at increasing levels increased chlorophyll content, although the range was not as wide as the quality ratings might have suggested. Older stands also had clippings with higher chlorophyll content, again with less range than in quality ratings. Chlorophyll values for the different fertilizer sources, however, did not reflect the ratings, with ammonium sulfate and sulfur-coated urea midway between IBDU and urea. The mottled appearance of the sulfur-coated urea plots reduced quality ratings but did not affect total chlorophyll. The acidified portions of the 1977 plots had higher average chlorophyll values (5.4 ppm) than their pairs with unchanged sand. Chlorophyll levels of the older plots were significantly greater than those of the acidified sand plots established in 1977.

ONE OF THE reasons for this comparison of different ages of stand was the increased root depth displayed by newly established grass, compared with older stands. This had been demonstrated by Eckhardt[1] on this green, and the 1970 and 1974 plots were inheritances from his study. Our data in *Table 3* show that higher rates of nitrogen reduced root growth, but nitrogen sources had no significant effect. There was a significant effect of age, however, with the youngest stand much longer-rooted than either of the older ones. Deepest roots were those in the acidified sand (112 mm vs 105). Our data indicate that although newly seeded plots did have deeper roots, the best quality turf was that of the older stands fertilized at ½ to 1 pound of nitrogen per 1,000 square feet every two weeks during the cooler time of the year. Those rates of nitrogen were most effective when they were applied biweekly as ammonium sulfate, with a relatively poor showing by sulfur-coated urea and IBDU. Although no saving time performance bonus occurred with the latter two, the better performance of the older stands probably includes a component due to nitrogen retention and slow release by organic material in thatch.

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[1]Eckhardt, James H., 1975. Root decline of sodded, seeded, and mature bentgrass turf as affected by nitrogen and temperature. M.S. Thesis, University of Arizona.