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From there on back the trouble may be from worn or dirty breaker points, defective condenser or magneto. If the latter, it's best to have an expert ignition man attend repairs. The engine instruction book is the guide to go by for ignition timing.

You may have noted that I have mentioned instruction manuals or books a number of times. In my travels on field service calls I carry such reference material with me. In fact I have at least 2 brief cases so full of service information that it is difficult to close the fasteners. Do not be the least bit embarrassed before your men to take out a service book when you have trouble. No one is smart enough to carry all such information in his head. The smart fellow is the one who knows where to get the answer to a question,-and smarter still is the one who has it available and catalogued for quick reference. There are many points which I have skipped in this discussion, and, later if we have time we shall take up particular questions.

Checking Fuel System

The fuel system should be checked from the supply tank, on thru to the intake manifold. The check list for this is a clean and properly oiled air filter, sufficient gasoline in the tank, an open vent in tank cap if it is of vacuum type; or, sealed cap if pressure fed. An open and clear tank shut-off valve or pet cock, clean sediment bowl (free from water), clear fuel line, open and properly adjusted mixture needle valve, free-working choke and throttle butterflies, free float and supply regulating pin, clear mixing jets of proper size, and a tight intake manifold. Sometimes cast intake manifolds have defects caused by "sand holes" from the casting cores, and these may cause a too lean fuel mixture. Four cycle engines may have defective valves caused by improper setting, wear, warp or accumulated carbon. Valve and ignition timing has to be right on single cylinder engines. With 4 or more cylinders, timing may be more out of adjustment, and still start and run-as the cylinders help one another so to speak, like a four footed animal can make better travel speed than two legged man.

It is good practice to have engines overhauled yearly at an authorized service station handling that particular make. Such stations have the tools, equipment, parts, knowledge and ability to do the job right. In my business I "farm out" some of my engine and magneto work. Authorized engine service stations also can advise what parts to keep on hand for emergencies during your work season.

Checking the Mower

Care and adjustment of traction clutches varies with makes of mowers. Again I suggest you refer to your service books. This also applies to the cutting mechanism. There is a certain "feel" to these adjustments which can be shown by the mower serviceman, and the operator can acquire by practice and experience. Too often trouble is caused by uneven or too tight setting, and a real type mower will become dull if the adjustment is too loose.

Bed knives adjusted by hand knobs may be set too tight on the right side, if the operator is right handed, and vice-versa if he is left handed. If anything, the adjustment should be just a little looser on the side where reel blades make first contact with the bed knife. Knives set by screwdriver or wrenches are a greater problem than knob type adjusters. Supply your men with smooth handle, and the shortest practical length screw-drivers, and the shortest wrenches, and avoid not only too tight setting, but also stripped threads and broken castings.

Before removing any mower part it is well to clean it thoroughly and inspect how it is attached. This especially applies to gears, sprockets and pulleys on shafts. Look for keyways, turn the shaft a complete revolution, to search for set or lock screws. You either will break the part being removed, or badly cut the shaft by pulling off a part locked on. Service work requires proper and a good assortment of tools. Modern machinery has "Allen" and "Phillips" type screws which are difficult to turn with plain screw-drivers, altho it has been done. Hammer, screw-driver, pliers and monkey wrench-and a piece of hay baling wire got us by in the days of the Model T Ford, but engineering design and mechanics have advanced to special tools for special jobs today. Finding the trouble and cause is but part of the jobto rectify-or avoid trouble, let's touch on various matters pertaining to mower service.

Sharpening Mowers

Honing, lapping-in, or back grinding mower knives if frequently done will help keep cutting edges sharp. I have seen mowers in use for 10 or more years that never have been placed on a mechanical grinder, and still they cut well. These, admittedly are rare instances, but it proves that a grinding job is not always needed. Carborundum grit is preferred to common emery powder. For mower work consider Carborundum No. 40 as "coarse," No. 60 to No. 100 as "medium," and up to No. 210 as "fine." This mixed with light oil, or, preferably a medium soap paste or diluted syrup such as molasses can be used. The soap or syrup mix will wash off easily with water hose after the honing job is completed. It is important to remove all the grit after back-grinding, else when the mower is used the grit may spoil the new cutting edges.

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From the Toro Family Album



1921—Here you see an old photograph taken on the fairways of the Hillcrest Country Club at Kansas City, Missouri, 26 years ago.

This was one of the first ten Toro Push-Type Tractors that went into service on golf courses and started the trend toward mowing by power. Up to that time, practically all mowing was done with horses.

And those were the days! With six men in the factory, the country in a depression period, and with no field organization and little capital, it was a continuous struggle to survive.

But Toro's greatest asset was a tractor so highly efficient that some of these old-timers are still running, although we have not built them since 1933.

1947—Twenty-six years have gone by. Over 400 men and women are employed in building Toro mowing machinery. This year we expect to ship \$4,000,000 worth of Toro mowers.

Pictured at the left is a 1947 Toro General Tractor—one of a pair shipped to Cypress Point and Pebble Beach where the National Amateur Championship will be held this year.

The St. Louis Country Club, scene of the National Open, is another user. So is the Augusta National at Augusta, Ga. Plum Hollow at Detroit, where the P.G.A. will meet, Wakonda at Des Moines, and dozens of other national Championship Golf Courses have long since standardized on Toro Machinery.

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Use a round "sash" or "stencil" brush to apply the compound; rotate the brush as it is passed over the full length of reel. Dip brush in compound, apply full rotated stroke, dip again and go back to assure even distribution. Knives should be adjusted lightly and when sound of the grit action stops, apply more compound. As edges are honed in, it will be necessary to make further adjustment of knives until sharp edges result. A hand crank, electric drill, or motor flexible shaft with proper arbor to fit the shaft or nut on reel end may be used, or a V-belt pulley attached, driven by a motor. Turning backwards, the reel should not spin too fast, or the compound will be thrown off. A speed of 400 to 900 r.p.m. is suggested. To slow the speed of an electric motor, a lamp bulb in socket in series with the motor will act as a resistor, and the lamp wattage used will determine the speed.

Test for sharpness with strips of newspaper, each reel blade should cut paper the full contact length of the bottom knife. If it cuts most places and pinches in some, this is satisfactory in many cases. Carborundum No. 80 is commonly used on hand and power mowers, but a first honing of coarser grit may speed up the work on gang mower units, and finished off with finer grit.

On badly nicked or worn blades, a power grinding job may be needed. If you attempt this work the first time, practice on an old hand mower, as an inexperienced man can wear a lot of good steel off learning the job. Methods vary with the type of grinder, and these are described in operation manuals. Both the bed knife and reel should be sharpened, each separately, on a power grinder.

Worn or loose bed knife screws, studs, or bushings may cause wavy bed knives, and also loose reel bearings. All end play and up and down play should be eliminated before lapping or grinding work starts.

Watch Lubrication Carefully

Lubrication, at proper intervals with correct grade oils and greases will prevent considerable wear. A painted spot different than the general color of the mower, at each lubrication point helps draw it to attention. Some manufacturers now follow this practice. Exposed roller chains, "Oilite"-oil impregnated metal alloys (usually bronze) should not be lubricated unless instructions say so. Sealed bearings with shields on both sides should not be washed in kerosene, gasoline, degreas-ing fluids or solvents. Rinse them and wipe clean in light grade motor oil. A bulletin "Service Procedure for Ball Bearings" No. ND-A57, compiled and published by the New Departure Division of General Motors Corp., Bristol, Conn., is well worth

reading, and can be obtained free on request.

Standard Hardware, Bolts, Nuts, etcetra

A good rainy-day job, or anytime for that matter, is to check over all fastenings. Even then, a bolt may be lost, or a nut fall off. To put back any bolt is better than none at all, but the right one is the size that was lost. Therefore, a wise thing to do is to go to a hardware store and buy a dozen of each standard size nut, bolt, lock and flat washer, and cotter pins, of variety that you may need. From 1/4 to 1/2 inch diameter, and up to 2 inches long, is a good average, with nuts and washers to fit. Get both types thread, USS (or National Coarse "NC") and SAE, (or National Fine "NF") as each is used for a different purpose. All bolts or studs that screw into castings are coarse thread. Those fastened by nuts may be either coarse or fine. A kit of tools comprising box, open end and socket wrenches, various size screwdrivers, both common and "Phillips", assorted "Allen" wrenches, good pliers, and at least two sizes of machinist hammers will enable you to do most servicing jobs. A can or bottle of graphite or penetrating oil will help loosen tight fittings that may have rusted.



Golfdom

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June, 1947

Switching Seasonal Greens at Sea Island, Ga.

By T. M. BAUMGARDNER

Landscape Architect, Sea Island (Ga.) CO.

The Southeast encompasses a greater variation of climatic and soil conditions from its southern to northern most extremities than any other section of the country. Winter grass seeding time will vary as much as 2 to 3 months between the two extremes. Soil conditions range between the lightest of sands to the heaviest of clays. Good management methods in converting from one predominate putting green grass to another may vary almost as greatly.

Since I could not hope to intelligently discuss the varied problems encountered in this change-over procedure for all sections of the southeast and instead of merely dealing in generalities, of which most of you are already familiar, I will just try to tell you a little about how we handle this problem at Sea Island.

For the past few years at Sea Island, we have not interrupted play on either 9 holes for the seeding operation and we find that we have just about as good results as formerly, when we closed each 9 alternately for 2 or 3 weeks while seeding. We now start getting our greens ready for rye grass seeding in September by scarifying them thoroughly to remove any accumulated nap and coarse stolons and runners of the Bermuda grass.

We used to do this scarifying in October, immediately before seeding, when we were able to close each 9 for a time, but we found that by scarifying earlier, we have a better base of finer textured, young Bermuda grass at ryegrass seeding time, which prevents excessive wear on the tender rye grass seedlings and provides a better putting surface for the early fall months while the rye grass is getting started.

Scarifying by Power

Scarifying is done with the scarifier attachment on a Toro "Park Special" power mower, or the scarifier blade of the "Sensation" single rotary blade power mower. Fairly satisfactory results can also be obtained by severe hand raking, but we believe there is greater disturbance of the putting surface and, of course, hand raking is much more expensive because of the greater time and labor hours consumed.

Immediately after the scarifying operation, the greens are cut as closely as possible with the power putting green mower

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in two directions, then spiked and top-dressed.

We mix with this topdressing approximately 20 lbs. of super-phosphate, 10 lbs. of muriate of potash, 25 lbs. of lime and 5 lbs. of arsenate of lead for each 1,000 sq. ft. of area (arsenate of lead application is for mole and cricket control).

We prefer not to do any nitrogen feeding at this time if the rye grass seeding time is a month or less away. Play is not interrupted during this scarifying procedure although the greens will be a bit stubbly and off-color for a week or two. Our greens are usually seeded with rye grass about the last week in October or the first week in November, depending somewhat on weather conditions. If the weather is unseasonably warm, we delay seeding until a little later. Rye grass seed is applied, after spiking, with a "Cyclone" seeder at the rate of approximately 150 to 200 lbs. per average 6,000 sq. ft. green and immediately topdressed, with no fertilizing at this time.

Fungicide, usually 2 parts calomel to 1 part corrosive sublimate, is applied at the rate of 3 ounces to 1,000 sq. ft. as a brown patch and dollar spot preventative, and greens are carefully watered every day until seed is well up. Play is not interrupted but greens are mowed a little higher than usual for about 2 weeks, then normal cutting height is resumed and greens are again seeded, using approximately 50 to 100 lbs. of rye grass to the green, and topdressed along with an application of approximately 25 lbs. Milorganite to 1,000 sq. ft. and a second application of fungicide applied, and normal cutting height is continued.

Substitutes Unsatisfactory

Our greens are normally spiked, topdressed and fertilized throughout the season thereafter at 4 to 5 week intervals, using Milorganite or sulphate of ammonia, alternating with 6-8-4 fertilizer mixed with the topdressing soil. Fungicide treatments are given only when weather conditions seem suitable for fungus disease development or at the first indication of brown patch or dollar spot on any green, all greens are treated. We formerly used a small quantity of red top seed along with rye grass seed but we have discontinued this practice because of greater susceptibility



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June, 1947

of red top to fungus diseases. We have tried both bluegrass and Seaside bent on an experimental plot as a substitute for rye grass, but found neither satisfactory under our conditions.

It is practically impossible, as you all know, to follow any common practice or set rule in changing over from rye grass to Bermuda grass in the spring for so much depends upon weather conditions and observation of the condition of both the Bermuda grass and rye grass in the greens at the time.

Then too, no two courses can be handled quite the same due to variable soil and climatic conditions and the intensity of the Spring play on the particular course. For instance—at Sea Island we try to hold our rye grass in the greens pretty well through May because we want our greens in the best possible conditions for our heavy Spring season play and we often still have some rye grass in the greens well into June.

However, I know that on many courses it may be advisable to encourage the dying out of the rye grass sooner than this. This can usually be accomplished by heavily fertilizing with ammonium sulphate or ammonium nitrate (8 to 10 lbs. to the 1,000 sq. ft.) and watering thoroughly each day thereafter for a week or so and then if the weather man cooperates, let the greens dry out for a few days to encourage dying out of the rye grass.

Then the greens may be spiked and topdressed and seeded with Hulled Bermuda grass to encourage as quick growth as possible of the Bermuda. However, we have not found this method very practical at Sea Island because we find that we have too many bare spots in the greens where the Bermuda has not filled in to take the place of the rye, and we prefer to let the rye go out more gradually for this reason. Even then we may get a few thin spots on some greens in late May or early June, but under our conditions this is usually not serious.

We usually apply 5 to 10 lbs. of hulled Bermuda grass seed per green along with the April or May topdressing. The seedling Bermuda grass is finer textured for the first season or two but sometimes doesn't have much chance of competing with the established Bermuda stolons.

I believe a great deal of the trouble experienced in the change-over of rye grass to Bermuda grass, at least in our section, may be caused by poor drainage and poor aeration and unfavorable physical conditions of the soil. If the soil in the greens is well drained and aerated and has a well balanced proportion of humus and sharp sand, the Bermuda will naturally be deeper rooted and I think it might be said that the deeper rooted the Bermuda grass, the less

trouble will be experienced in the changeover as well as, of course, throughout the season. With deep rooted grass, the change-over should normally be gradual enough to eliminate any serious bareness at any time.

I believe many courses which have resorted to such practices as seeding only half of the greens areas, or using two sets of greens, might have avoided this by improving the drainage and physical condition of the soil, along with intelligent handling of watering, fertilizing and topdressing.

Perhaps some day Dr. Burton, Dr. Grau or Dr. Noer will come up with a grass that will answer the southeastern greenkeepers' prayer, that is a suitable textured grass which will grow for 12 months in the year instead of 6 or 8; but, until that time, we will just have to worry along with summer grasses and winter grasses.

COURSE CONDITION TIED-UP WITH PRO SHOP SALES

Bob Munk, pro-gkpr. at the Jacksonville (III.) CC, sent out to his members a letter which brought pro shop sales by using a selling point that is logical but seldom considered. The theme of Bob's message was that the member who plays with inferior equipment on a well-conditioned golf course is not taking advantage of the excellent course he already has bought.

It's an angle that probably would occur to a pro-greenkeeper quicker than to a pro who doesn't have to get the course into good shape, nevertheless it's a point that can be effectively used in showing members that the pro and greenkeeper constitute a team working closely together for the members' profit in enjoyment.

Munk's letter is headed: "Would you play a Stradivarius with a broken bow?"

It reads:

Have you noticed the greens lately? Pure bent grass—no dandelions—no crabgrass—no clover—no mat—no grain—just pure bent turf—healthy and vibrant smooth as a billiard table—putts true and straight from every angle.

Greens like these are not an accident. They require lots of money and effort. Why not take advantage of the country club's efforts to provide an ideal golf course by using good golf balls and fine golf clubs? If you want to play golf get every enjoyment the game can afford. I would rather play a mediocre course with a good new ball and a well-balanced set of clubs than to play the finest golf course in the country with an old battered-up ball and a set of mis-matched, poorly-balanced clubs.

This country club merits the use of good equipment!