

certain percentage should be provided for the item of trees, as they are just as much a part of a golf course as a trap or bunker.

At Glen Echo Country Club we are blessed with a great many old trees—oak, elm, sweet gum, and hard maple predominating. We have had considerable trouble with our large oaks, especially those that are located near a green where it was necessary to keep the turf under them well mowed. Three years ago a number of the larger oak trees were showing signs of distress. The foliage was of a pale color and occasionally a large limb would die. The city forester was called on for advice, and he said our conditions were so unnatural that it would be necessary to provide both food and water artificially for these oaks.

Four particularly fine specimens were located on the crest of a hill where such rain as we get in this part of the country during July and August immediately runs off, leaving the ground hard and dry. To spade up around them would have damaged two greens, so it was necessary to find some other method of treating them. After considerable discussion it was decided to feed and water them by means of sub-irrigation. Around each tree was built a circle of 6-inch sewer pipe, the circle being about 20 feet in diameter. This was placed about 6 inches below the surface of the ground and no cement was used in the joints. At the point nearest to a hydrant a T-opening was brought up to the level of the ground and provided with a cover. At six or eight points around the tree, spaced about equal distance, there were cut into this circle of sewer pipe radially disposed branches, running about 4 to 5 feet farther out from the trunk of the tree. At the end of these branches were excavated pits 2 to 3 feet square and from 2 to 2½ feet deep, which were filled with manure to within 6 inches of the surface of the ground. The holes were then top-dressed and resodded. It was then possible to insert a hose in the T-opening at the surface of the ground and to fill this entire system full of water. The water runs into the holes filled with the porous fertilizer and provides a reservoir for a considerable supply.

The result of this work was most apparent. The trees took on a very deep shade of green and not one dead branch has appeared upon them. The cost of material was very nominal and a few days' labor of one man constituted the labor charge. We are very much pleased with the results which we have obtained and expect to make the same installation on other trees similarly situated.

Friendly Birds on the Golf Course

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Although tramping humans, swinging clubs, and flying balls do not seem part of an inviting resort for birds, the fact remains that golf courses are very attractive to some kinds of our feathered friends. While balls may on occasion come uncomfortably near, birds seem to realize that nothing personal is intended and they are not thus easily driven away from favorite feeding grounds. Indeed, the balls occasionally prove attractive, swallows and swifts darting after high flyers, and the thump of balls on the ground, in the view of some birds, seems to require investiga-

tion. Brown thrashers and robins have come in great excitement to practice pitches to a green, and persisted in their inspection with balls falling all about them.

Meadowlarks and killdeers especially like the fairways, and in winter horned larks are seen on them in regions they seem otherwise to avoid. Kingbirds sally out over the course from convenient perches, and swifts and swallows weave over them their mazy flight. The tiny house-wren, with its home in a convenient post or nest-box, darts to the ground for a morsel of insect food its keen eyes have spied, and the large (and by contrast dignified) flicker works persistently on any ant colony it discovers.

Not only are the activities of birds on golf courses very interesting, but they are also highly beneficial. Many a pest falls prey to birds which working unseen would produce those brown or bare spots in the turf to the regret and detriment of all golfers. Some of these birds and the pests of golf courses they devour are:

Robin. The best known of all our birds; pleasing in appearance; sprightly yet confiding in manner; a cheery songster, and an arch foe of earthworms and white grubs. Cutworms, army-worms, grasshoppers and bill-bugs, all enemies of turf, also are eaten by the robin, two-fifths of whose diet consists of these and related forms. Robins can be attracted by planting fruit-bearing shrubs, and by supplying open-sided bird-houses or shelf supports for their nests.

Bluebird. A beauty; the harbinger of spring; with a warble that seems to well up from its heart; our best loved bird; for it was named "bluebird weather," the kind that makes you feel that "all's well in the world." Of material values may be mentioned the consumption of cutworms, grasshoppers, the adults of white grubs, and earthworms; two-thirds of the bluebirds' food is insects. Bluebirds love nest-boxes; put some up.

Purple martin. Everyone wants a martin colony. And why? Because these large handsome swallows are so entertaining with their expert flight and mellow notes, and so useful as insect destroyers. Clover-weevils, clover-root-borers, the parents of white-grubs, cut-worm moths, the grass-eating leather-jackets or larvae of crane-flies, mosquitos and other biting flies are favorite items of the almost exclusively insect diet of the purple martin. Martins nest only in colonies, and numerous forms of artistic houses, ornamental to any open space, may be had.

Killdeer. A lover of closely cropped, rolling uplands; a handsome, active and noisy bird; repeating at every disturbance its loud and penetrating call of "kill-dee, kill-dee." The killdeer is a very effective insect hunter and is fond of such turf-destroying kinds as bill-bugs, clover-root weevil, clover-leaf weevil, white grubs, wireworms, cutworms, grasshoppers, ants, and larvae of crane-flies. The wigglers of mosquitos also are consumed. The killdeer nests in exposed situations, and nests found on golf courses should be protected; a small square of wire-cloth supported above the eggs on four stakes would save the day. The young killdeers, which from birth rove in charge of their parents, are very pretty and interesting little creatures.

Flicker. The largest woodpecker ordinarily seen; a handsome fellow whose yellow quills give him the name of goldenwing; his rollicking, ringing calls and spirited courtship attract much attention in spring. The flicker is the most effective destroyer of ants among our birds, practically

half of its food consisting of these little nuisances. More than 5,000 ants have been taken at a meal by the goldenwing. Chinch bugs, grasshoppers, cutworms, and larvae of crane-flies and March-flies are other grass pests on the bill-of-fare of the flicker. Nest-boxes are attractive to the flicker, which has exchanged the straight, wood-chisel bill of the woodpecker tribe for a curved dirt-mattock, and hence is less fitted for excavating an apartment in a tree.

Meadowlark. The clear piping of the meadowlark is an inspiring note familiar to all frequenting grasslands in spring. The field-lark (as the bird also is called) has a bright yellow breast with a black crescent, and a strong, direct flight reminiscent of some of the game-girds. About seven-tenths of this bird's food consists of insects; and chinch-bugs, white grubs, grasshoppers, clover-leaf weevils, army-worms and other grass-eaters are consumed. The meadowlark is one of our most valuable birds; but while it will visit the fairways as much as possible it will hardly nest on most golf courses, because of the lack of the tall grass for breeding cover which it prefers.

Chipping sparrow. The red-capped chippy or hair-bird is a familiar species throughout the Union, building its horse-hair lined nest in vines and shrubbery near houses. The chippy has the reputation of feeding on numerous insect pests, and is known to take among other enemies of the fairway, army worms, cutworms, the adults of wireworms and white grubs, grasshoppers, and ants. Protection and shrubbery for nesting sites are the only requirements for attracting this species.

Dickcissel. Formerly an inhabitant of the Atlantic slope, this species now has abandoned the region east of the Alleghanies; it is very common in the upper Mississippi valley. It is a bird of the open, is a tireless though monotonous songster, and from its coloration is sometimes called the little meadowlark. Grasshoppers, which are ravenous grass-eaters, make up two-fifths of the food of the dickeissel; clover-root weevils, cutworms, and wireworms, also are consumed. Nesting sites of the dickeissel are similar to those for the meadowlark, hence on most golf courses the bird can be expected only after the breeding season.

Starling. So far, this short-tailed blackbird, its greenish coat spangled with cream-color, and with a yellow bill in the breeding season, will not have been seen on golf courses west of Ohio. It is an Old World species, introduced many years ago about New York city, but which has increased and spread rapidly in recent years. It is one of the most effective destroyers of small ground vermin, specializing upon millipeds or thousand-legged worms and cutworms. Clover-leaf and clover-root weevils, wireworms, grasshoppers, ants and earthworms are other pests of golf-courses eaten by the starling. Bird-houses are readily accepted by starlings; in fact, the species is ever ready to dispossess prior occupants of nest-boxes; its aggressiveness is such that the question whether the species should be encouraged is always in order.

In the preceding accounts attention has been called particularly to insect pests eaten by birds commonly resorting to golf courses, but there is another side of bird utility that should not be overlooked. Seed-eaters are as numerous as the insect-eaters, and on golf-courses where seed production by any plants whatever is undesirable the services of these birds should be accorded their highest value. Nearly all of the numerous kinds

of sparrows are habitual seed-eaters; among them we may name the gold-finch or wild canary, the chippy, the field sparrow, indigo bunting, and cardinal or redbird. In winter snowbirds or juncos and tree-sparrows of the same family, and horned larks are abundant visitors, and are among the most efficient seed consumers.

Winter birds may be attracted by providing feeding stations and by planting evergreens for roosting shelters; in summer, nest-boxes, bathing and drinking fountains, and fruit-bearing shrubs are the most potent attractions. Shrubbery should be more of a feature of golf courses than at present, in all areas out-of-bounds, and to re-enforce tree, ravine, and water hazards. Kinds having fruits for bird food are superior, as they are ornamental through a longer season and give very desirable touches of color to the landscape.

Further information on all methods of attracting birds can be obtained by applying to the Biological Survey, U. S. Department of Agriculture.

On Traps

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A style of trap one often sees, even on very good courses, seems to the writer to be objectionable. Isn't it good construction to make traps in such a way that one can get a free back swing for his club, wherever in the trap his ball may lie? Isn't it poor construction to let the trap, on the side away from the hole, drop vertically or almost vertically for six or eight or even twelve or fifteen inches below the general surface of the ground, making thus a wall at the back of the trap? A ball that just trickles into the trap and lies at the foot of such a wall can hardly be played toward the hole, no back swing of the club being possible. A vertical stroke with a niblick upon a ball lying in sand is a very difficulty and often an almost impossible stroke. Most good golfers would probably decide, in such a lie, that discretion is the better part of valor and would play the ball out sideways or backward, but it is hardly the purpose of traps to necessitate such loss of a full stroke. The purpose is rather to make a stroke in which distance and accuracy are very difficult, but not impossible. Good recovery from a trap is one of the exhilarating things in golf. A ball unplayable toward the hole is a depressing thing, a thing one has to give up to rather than a thing to challenge the player to extra effort.

To avoid the point criticised, of course, all that is necessary is to make the side of the trap distal from the hole grade up gradually to the ground level, giving no vertical wall for the ball to hide below.

During the last month the writer has visited and studied some of the best courses in the Boston district and some in the vicinity of Washington and in most of these there are some traps with vertical walls at their distal edges. It is probably true that in most heavily trapped courses some traps of this sort will be found. Is it the best type of construction so to build them?