fully raked every day; a red stick in those that need be visited more or less—the ones that need partial raking rather frequently; and a white stick in those not used at all, for which only one raking a month would answer. The chairman used 25 blue sticks, 25 red sticks, and 132 white sticks. After he had mulled over his observations, he found that he could safely cut out two men—kept busy mostly in raking little-used bunkers. Incidentally he discovered that sharp sand is not the best bunker sand. Round-grained sand, like that of the seashore, rolls better, and at least partially fills all footprints, while the sharp sand has a pronounced tendency to pack.

Remedying a Muddy Ditch Hazard

E. J. MARSHALL

Nearly every golf course is traversed by a ditch or small brook into which balls are shot by the hundred. The constant stirring up of the bottom of such a ditch is sure to keep it soft and mushy, so that balls sink into the mud and are difficult to find. Each set of players and caddies that look for a ball stir up the water and mud and make the situation just a little bit worse for the next set. When the end of the day comes the ditch looks like a hog-wallow, and the mud is knee deep. Hundreds of balls are thus lost and the play around the course is impeded. Such a situation can easily be remedied by putting a concrete bottom in the ditch.

Dam the water back away from the part of the ditch to be fixed up; remove enough mud to allow concrete to be put in so the top of the concrete will be level with the bottom of the ditch; put in three or four inches of rough concrete.

The cost of fixing up such a ditch in a bad spot should not exceed twenty-five dollars, and it may save each member four or five dollars during the playing season. When the water in the ditch gets high, it should not be much trouble to put a screen of, say, ¾-inch mesh across the lower end of the concrete to catch and stop balls that bob along the bottom of the ditch. A stew-pan with holes in the bottom fastened on a stick can be left at the lower end of the ditch to be used to fish out balls. The avoidance of congestion on the course is worth more than the cost of the concrete, to say nothing of the saving to members.

Lawn Pennywort: A New Weed on Golf Courses

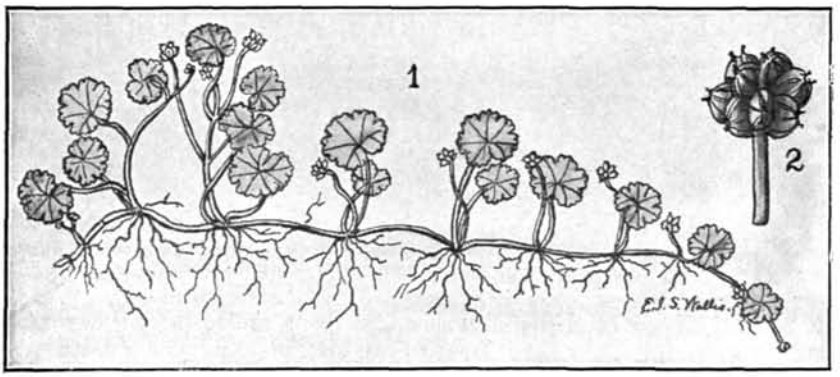
By A. A. HANSEN

A number of years ago a plant from southern Asia grew in greenhouses in the United States. During the period from 1890 to 1895 it found some use as a border plant and for flat bedding purposes. On account of its outdoor use, the plant spread and infested near-by lawns, in which the species became very aggressive and abundant.

It is particularly undesirable on golf greens, where it is readily disseminated by the seeds adhering to the shoes of players, especially following rains, when the ground is muddy. Large patches of the plant which recently appeared on the golf greens of the Washington Country Club, near Washington, D. C., not only damaged the turf, but were also obnoxious

because the weed became infested in the fall with a fungus that caused the diseased areas to become slimy and disagreeable. The fungus did not eradicate the weed.

On account of its comparatively recent introduction into the United States and because the plant has become abundant only during the past few years, it does not as yet possess a generally accepted common name. Several closely related species are known as *water pennyworts.* On account of its habit of growing on lawns, the name *lawn pennywort* seems appropriate, and is therefore suggested as the common name.



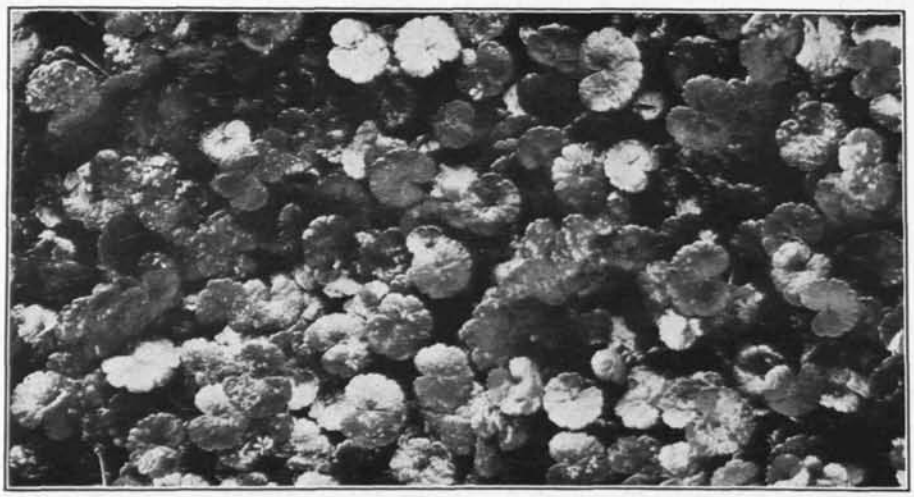
Lawn pennywort (Hydrocotyle rotundifolia). 1. The creeping stem, showing the leaves and seed-heads. Note the tufts of fibrous roots originating at the nodes. (Natural size.) 2. A single seed-head, showing the compact mass of fruits at the end of the seed-stalk, characteristic of the species. Closely related species either have fruits possessing individual stalks or else the clusters are scattered along the entir seed-stalk.

Description

Lawn pennywort is a creeping perennial, growing typically in dense patches. The slender stems not only creep along the surface of the soil, but they also grow a short distance below the soil surface. The mass of closely interwoven stems enables the plant to live over winter. Small tufts of slender, fibrous roots occur at the nodes, which are distributed at intervals on the creeping stem. The leaves and flowering stalks also grow from the nodes. A tiny cluster of white flowers terminates each flowering stalk. The flowers appear during early summer and are soon replaced by the disk-shaped seeds, which somewhat resemble the seeds of wild parsley, although considerably smaller. The leaves are shield-shaped, shiny, and smooth, each possessing a slender stalk arising directly from the creeping stem. The leaves vary from one-fourth to three-fourths of an inch in diameter.

There are seven species of pennywort occurring in the United States. The lawn pennywort can be distinguished from all the others by the fact that the flowers and seeds occur in compact clusters, one cluster at the terminus of each flowering stalk. In the other species, each flower either possesses its own separate stalk or else the clusters occur at intervals along the flowering stalks.

In the open, lawn pennywort grows abundantly in sunny situations. In greenhouses it thrives in the shade of the benches. On account of its ability to grow in the shade, experiments were made to determine whether the



A compact mass of lawn pennywort, showing the character of the foliage and the small fruiting heads. The lawn grass apparently has all been crowded out by the vigorous growth of the weed. (Natural size.)

plant could be used in shady situations, such as under large trees and in the shade of buildings where lawn grasses refuse to grow. Both transplanting the sod of lawn pennywort and the sowing of seeds in the spring failed to produce a stand of the plant in densely shaded places out of doors.

Distribution

Lawn pennywort is widely distributed in the District of Columbia, where it infests lawns, golf courses, and greenhouse beds. The plant is also prevalent in the vicinity of Philadelphia and Pocono Lake, Pa., and is a pest in Cave Hill Cemetery, Louisville, Ky., where it is said to have been introduced by florists. The weed has also infested part of the course of the Merion Cricket Club, Ardmore, Pa., where the seeds were evidently brought by a small brook that flows through the course. Although its present distribution is somewhat limited, lawn pennywort seems to be increasing its range rapidly. Unless the plant is eradicated on its first appearance in new localities, it bids fair to become one of the worst lawn weeds in the eastern United States.

Eradication

Lawn pennywort occurs on the turf in compact patches. When the weed first appears, the patches should be cut out, and all the plants either burned or otherwise destroyed. It should be remembered that if the removed plants are simply cast aside they are likely to mature seeds in a short time, and these seeds may cause a new infestation of the weed. The bare spots in the turf should be either resodded or else fertilized and seeded to good turf grasses.

Experiments to eradicate lawn pennywort by spraying with solutions of common salt, arsenic, and iron sulphate, and with gasoline, have proved unsuccessful. All the sprays mentioned killed the leaves, but the creeping stems were only slightly harmed and soon sent up a new crop of leaves.

It is of primary importance to eradicate lawn pennywort when it first

appears on the premises. Greenkeepers, particularly in the regions in which the weed is known to occur, should be on the lookout for the plant and should not allow it to obtain a foothold. Preventive measures are far more effective than control methods. The leaves of the plant die in winter, thus leaving bare spots in the turf, but the plant renews its growth with the appearance of warm weather in spring.

Golf Architecture: A Few Opinions

N. STUART CAMPBELL

It is very gratifying to those who have at heart the betterment of golf and golf courses, to see the rapidly increasing number of men who are thinking about that absorbing subject, golf architecture. Some of these men are interested professionally and some merely for recreation, but probably all are sincere in their desire to help raise still higher the standards of golf in this country. While we do not know what developments the future will bring, immense forward strides have been made in recent years.

Fortunately, the ideas of all those interested in the subject do not agree, but unquestionably there are certain fundamentals upon which, in the light of present-day knowledge, the design of any course which is even to approach the ideal must be based. In addition to these fundamentals there are other features which are highly desirable even though without them the course might stand up very well under technical criticism. It would seem that the U. S. Golf Association Green Committee might make a real contribution to the cause by discussing some of these factors in THE BULLETIN and inviting criticism of the opinions expressed, for certainly ideas are most rapidly developed by frank discussion between people who are giving thought to the matter in question. Professional architects should welcome such a discussion, since the demand for the services of trained experts will constantly increase with the wider realization of the problems involved. The purpose of this article is to start such a discussion by expressing very crudely a few opinions as to what is either fundamental or desirable, without making any claim that these opinions are indisputable, or that they cover the subject thoroughly. To avoid repetition, however, they will be expressed in the form of statements.

Design and Construction

The first requisite for the ideal course is visibility. The player should be able to see what he has to do, golf being a test of skill and not guesswork. He should be able to see from the teeing ground all the important features of the hole he is to play, including bunkers or whatever trouble may threaten him. On each succeeding shot the remaining part of the hole should be visible, provided he is in the position he should have reached. On the approach shot, whatever the length, he must see the surface of the putting-green, and if possible all the ground between him and the hole. Of course the topography of the ground at his command will probably never quite allow the architect to realize this ideal, but he should approach it as closely as possible. If blind shots can not be