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(4) Fertilization as a means of controlling weeds is probably the most practical method known for both fairways and greens. The success of this method depends upon the factors of competition and differential food requirements of the desired grasses vs. the undesirable weeds. If a system of fertilization is followed which is particularly favorable for the desired grass, then most weeds are choked out and the weed problem is solved in a practical manner.

Some valuable data are available on this point from the long continued fertilizer experiments at the Pennsylvania Agricultural experiment station. Some points of special interest are here presented.

Fairway Weeding

For fairways: When blue grasses (*Poa* 'spp.) are desired for fairways the soil must be limed if calcium is deficient. A fertilizer containing ammonia (sol. nitrogen) and phosphoric acid, or superphos-'phate with the larger percentage of the latter, is the best combination for blue grass. The addition of potash favors clover as well as other weeds. It seems probable that the fescue grasses behave somewhat like blue grass to soil reactions, in that they appear to prefer the presence of lime. Not much experimental evidence is available on this point, however.

When red top (Agrostis alba) or bent grasses are desired, an abundance of lime is not so essential and the application of ammonia and potash with the latter element predominating is favorable for these grasses. The weeds are not so well controlled, however, with this combination since potash favors their growth. With some attention to hand or machine removal in weed areas, this problem can be solved, however, as these grasses will tend to replace the weeds if given favorable soil conditions.

Weed Control on Greens

For greens: The important weeds here are crab grass, chickweeds, and, in the East, goose grass and pearlwort.





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If the soil is natural or only slightly acid, then the application of fertilizers which tend toward the production of higher acidity is advisable where bent grasses are being grown. Applications of ammonium sulphate will bring about such a condition and tend to control the weeds by encouraging the grass, but this practice should not be continued indefinitely be cause of the danger of producing too great acidity in the soil. The desired balance may be generally maintained by substituting organic forms of nitrogen, such as urea, for ammonium sulphate in the fertilizer formula at the proper time.

If the soil is acid to begin with, avoid the excessive use of ammonium sulphate. Use a balanced fertilizer which will maintain the desired soil reaction.

Clover will not be troublesome if conditions are maintained which are most favorable for the grass. The liberal use of potash favors clover and other weeds; therefore, generally omit it or make it a minor part of the fertilizer program on greens. The addition of phosphorus in the form of superphosphate to the nitrogen carrier is recommended.

Crab grass and goose grass are especially troublesome late in the season. Hand weeding with the aid of a rake to loosen the runners in the case of heavy infestation of crab grass is the most effective method to follow. Goose grass must be pulled by hand.

Where *Poa annua* is dominant and it is desired to maintain the greens with this grass, ammonium sulphate should not be used as it promptly tends to produce an acid soil inimical to the growth of *Poa annua*. Use a balanced fertilizer with urea as the source of nitrogen.

Controlling Grass Diseases

 "Drum-head" patch was very severe and extensive in 1928. It was mistaken many times for "large brown patch," but is quite distinct.

Symptoms of "drum-head." (a) Bluish color of grass in spots of irregular size and outline. (b) Blades of grass become thin and narrow and the spots appear thinly covered with grass. (c) Grass "tracks" easily and the tracks persist. (d) Turf gets hard and crusty, and when a plug is removed the roots are dead and the turf very thin. (e) Water does not readily penetrate the affected spots, but in early stages frequent watering will temporarily hold them. (f) Grass eventually

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dies and spots turn brown. *Poa annua* is killed before the bent grasses.

Cause of drum-head. The appearance and history of this disease checks with the continued use of ammonium sulphate as a source of nitrogen on greens. This produces an acid condition in the soil which increases from year to year until the degree of acidity becomes so great that the grasses fail to grow and the roots commence to die. It is possible that such toxic salts as aluminum sulphate are produced in the soil, but there is also a probability that lack of bacterial action in the soil under such acid conditions may be a factor. The removal of lime in the soil under these conditions is also suggested as a possible factor since all plants require calcium for normal growth.

Remedy. Apply 25 pounds of ground limestone per 1,000 sq. ft. of green. Fork the diseased spots and water thoroughly. Mercury compounds or other fungicides are not effective in remedying this type of disease. Maintain the degree of acidity best adapted to the dominant grass desired on the greens. This may be done by using a balanced fertilizer with occasional light applications of limestone at intervals of perhaps not oftener than once in three or four years.



(2) Large brown patch. A widely distributed disease which attacks many grasses and other plants.

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Symptoms: Circular brown spots from a few inches to as much as 2 ft. in diameter. In the early morning when dew is present the margin of the spot shows a greasy ring of about 1 in. in width. Cobwebby threads are conspicuous on these spots when moisture is present. The spots increase in size from day to day, enlarging chiefly during the night. When spots are numerous they coalesce and may kill large irregular areas of grass.

Cause. A fungus known as Rhizoctonia solani.

Control. Apply mercury compounds, preferably the organic form of mercury, according to directions. The use of high-pressure spray pumps saves much time and makes the material go much further. Apply these fungicides immediately after the disease is first noted. Treat the rims and approaches as well as the greens.

(3) Small brown patch—a widely distributed disease of grasses which is quite distinct from large brown-patch.

Symptoms: The individual spots are small, rarely larger than a quarter-dollar,



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13

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Some three years not I started to hulld a golf course, cnowing very little about the strains of grass and day emming on others for guidance. I was influenced to use other strains in 14 greens before I discovered through control for information in various clubs that I was moking a mistains by not using Plosmoor.

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and most of them nearer the size of a dime or even smaller. The spots are usually a lighter brown than those of large brown-patch. They are "buff" or "tan" in color, especially in the early stages. The spots are usually numerous when first noted, and they may increase in number so rapidly that the grass on an entire green will be destroyed in a few days. Under such severe conditions this disease is sometimes mistaken for large brownpatch.

Cause. An undescribed fungus which attacks individual blades and spreads to a few adjacent leaves, but is restricted inits spread from a single point of infection by some biological factor not yet, understood.

Control. Same as for large brownpatch. Especial attention must be given to treating approaches and rims because this disease is invariably present outside the greens and is spread to the greens by mowers and the feet of players and workmen. The disease is spread in the greens chiefly by the mower. Do not attempt to treat individual spots. Treat the whole green with its rim and approaches as soon as the first spots appear.

(4) Other diseases and pests: "Ringpatch" and "snow mold" are both fungus diseases which are sometimes met with. Apparently the mercury compounds are effective, but little experimental work has been done with these diseases.

The grubs of the Japanese, Aserica, Asiatic, and other beetles are troublesome and dangerous in the Eastern areas. Arsenate of lead is being used effectively and so far seems to be generally safe. Use it cautiously and according to directions.

HALF of the golf clubs I've ever seen would be better off if the present pro shops were converted to caddle quarters and a new pro shop so built and located, that it would enable the pro to really take care of the members' business.

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Makes Clubhouse Help in Putting New Club Over

WITH a good background of hotel experience, J. W. Ryan recently was called to the management of the Olympic Golf and Country club at Seattle, (Wash.). He was with the Hotel Moore of that city, and was president of the Seattle chapters of the Greeters, when he was selected for the management of the golf club planning expansion and reorganization.

Reorganization of the Olympic club was being effected with the appointment of Mr. Ryan. A drive for new members was soon under way. At that time the Balcom Canal Company had owned 241 shares of the stock of the club, located on the north edge of the city, and commanding a beautiful view, looking upon the placid waters of Puget Sound fringed with evergreens. This stock had to be absorbed by the



members with its relinquishment by the canal company, and through the addition of many new members. The company had been capitalized for \$100,000, but this capitalization was increased to \$150,000 with the drive for new members.

Within a month 40 new members were secured and more than 400 were soon on the rolls of the Olympic club, to effect its complete reorganization.

Goes After A Profit.

In various ways economics have been effected and sources of revenue increased through skillful management. The dining room of the clubhouse which had not shown a profit before Mr. Ryan took charge of the clubhouse is now on a paying basis, while other revenue is derived from the use of the social hall for entertainment



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and gatherings.

The secret of how the dining room was made to show a profit by Mr. Ryan lies in the lengthening of the hours it now is kept open, the number of meals served daily, as well as in an economy in the employment of help. Only luncheon was previously prepared, and the overhead was too great for this one short repast. Now, with breakfast, luncheon, and dinner menus, the dining room has stepped out of the red.

In the employment of a married couple, Mr. Ryan secured a worker both for the cuisine and the locker room, the husband becoming locker-room attendant, the wife an assistant cook and waitress. Quarters on the premises were fitted up and furnished them in view of their long hours.

A well appointed hall in the clubhouse has been let for teas or dances, as well as for other social purposes, at the rate of about \$40 a night. Sometimes the hall has been in use for private entertainments as many as three times in a week, giving a revenue from this source of \$120 for such a week.

Each member of the Olympic club is required to purchase three shares of stock of \$100 per share, making an investment of \$300 on the part of each member. While the stock may be bought outright, the club permits payment on the installment plan.

Greens-fee players have been a source of some revenue as on week days they have been required to pay \$1.00, and on Saturdays, Sundays and holidays \$1.50. But the membership drive is absorbing many of those who liked these links, as members, and thus relieving a source of irritation on the part of members who found on occasions that there were so many greensfee players that the links were too crowded. Members with investment in the club and full privileges naturally have not enjoyed being held up on the links by greens-fee players.

From the membership itself a direct revenue is derived of \$7.70 per month, but of this the seventy cents is a government tax. If the federal government withdraws its taxation of seventy cent the club expects to charge dues of \$8.00 a month, and include the lockers with the fee, inasmuch as an additional \$1.00 is charged for the locker held by each member at present.

Social amenities add to the pleasure of

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administration and enjoyment of guests of this club. With 85 women members, there is no lack of pleasurable contact, and entertainments of a diversified nature. In the new membership drive the wives of members, friends of women members, and other women are joining to expand the women's membership, which is regarded as giving excellent balance to the club.

Drive Is Snappy.

The membership drive itself has been well conducted. Two opposing teams drove the membership over the 400 mark within a short time, terminating their campaign with the team of Captain Russ Mitchell winning, and being awarded golf balls as prizes. Each member getting a new mem-

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ber was given three new golf balls, and the captain of the winning team was given a whole dozen besides the three for each new member.



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