



A well designed green merges into the landscape. Here is an excellent example, the eleventh green at Cypress Point, viewed from the left of the line of play.

Twenty Years of Greenkeeping Have Taught Me Plenty

By DR. ALISTER MACKENZIE

Pasatiempo, Santa Cruz, Calif.
(Continued from August)

I OFTEN think that there is no preliminary training that is so useful in the treatment of golf courses as that of the medical man. Not only is his knowledge of chemistry, botany, biology, physiology, bacteriology, etc., of value, but of far greater importance is the mental training which prevents him interfering with nature and never using the drastic methods of the knife if a cure can be effected by simple means.

* * *

Modern medicine consists largely in discovering the causes of disease and supplying what is lacking in the human body such as extracts of the thyroid, pancreas, adrenal and other glands.

Similarly, in greenkeeping no treatment is required if nature can effect a cure. The knife should be avoided if better and more permanent results can be obtained by simpler means, and no drugs should be used except those necessary to replace constituents in the soil that are lacking and retarding the growth of the finer golfing grasses.

Nitrogen is the most important food for golfing grasses, but in providing nitrogen

it is important not to get too great a degree of acidity.

I have already said the USGA at first advocated lime, then stated it was poison and are now again advising its use. The question is a most difficult and complicated one.

Of one thing I am certain, and that is that I have seen more harm done to golf courses by the use of carbonate of lime and alkaline fertilizers than by anything else. Not only once, but scores of times, I have seen a beautiful sward of the finer grasses ruined by the application of alkalis. This has impressed me so strongly that I have even hesitated to advise carbonate of lime on the sour heathlands of Britain, peaty soil which has a much higher degree of acidity than any I have seen in America.

Puzzled at Cypress Point

At Cypress Point we were much distressed because the soil on the proposed fairways on the coast showed as high a degree of alkalinity as a pH of 8.4.

We were afraid that *agrostis maritima* (Seaside Bent) might not do well on such

highly alkaline soil, so before seeding we added a considerable amount of sulphur and since then we have used frequent dressings of sulphate of ammonia.

To our astonishment the fairways near the coast are as perfect as any we have ever seen, the *agrostis maritima* has dominated all the other grasses and there is not a weed or a leaf of clover to be seen anywhere.

It was entirely contrary to our experience that bent grasses could flourish in soil of such a high degree of alkalinity. There can be little doubt that the finer golfing grasses require an excess of nitrogen in the soil. This excess is usually associated with acidity so it is possible, or even probable that it is the amount of nitrogen that is of primary importance and that the pH is a secondary matter.

Virgin soil, or soil that has been uncultivated for many years always makes the best golfing ground. The word links originally denoted open, uncultivated land.

Cypress Point was constructed on virgin land. The pH varied from 4.5 to 8.4. Although most of the soil was rich in nitrogen, the richest was where the pH was highest. It is probably owing to this excess of nitrogen that we have been able to obtain fairways and greens that are considered to compare favorably with any in the world.

My view is that carbonate of lime should be used with extreme caution. There may be occasions when it may be necessary to counteract the ill-effects of over-dose of sulphate of ammonia or other chemicals, but in such cases it should be applied in small quantities and the effect carefully noted before giving it a second dressing.

There are a few points in regard to drainage I would like to emphasize and others that I would like to modify.

It is of the utmost importance that the water stratum should be tapped. For example, if a hard pan is present it is essential that this should be broken up and the drain tiles placed below the upper level of the pan.

It has already been pointed out that the drainage of a golf course is facilitated by the manner in which the construction is carried out.

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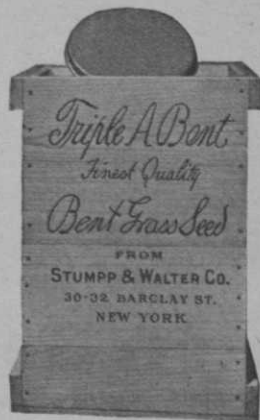
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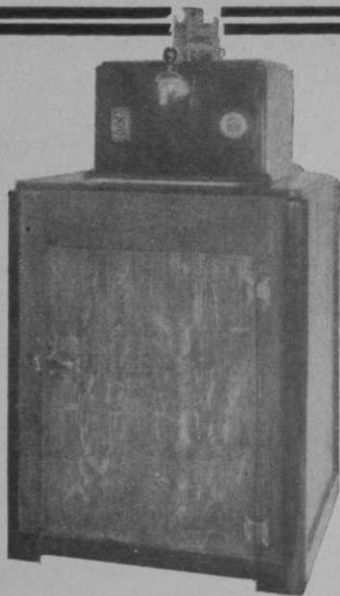
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water, and small pipes at the bottom of them will drain off any small pockets of water that remain. When a course is constructed in this way the expense of side drains is often unnecessary.

In the construction of a golf course this principle of swales communicating with deeper ones should be extended to all hollows on the greens, approaches, bunkers and any other communications wherever possible.

The kind of water used for irrigation is also of great importance. Irrigation may deposit an enormous quantity of undesirable salts during the year, so it is advisable in the choice of seed to be guided not only by the soil but also by the character of the water.

Water Problems

For example, at Sharps Park (San Francisco's new municipal course) the well water contained as large a proportion of common salt as 700 parts per million and so it was obvious that few grasses would flourish under these conditions. After the most careful inquiries we used *agrostis maritima* from Marshfield, Oregon, which we knew was flooded with sea water two months each year and we omitted *poa trivialis*, *pratensis* and the fescues we thought at one time would be desirable. At Pasatiempo, Santa Cruz, the fairways were nearly free from clover for the first few months, but this winter they became covered with it.

We attributed this to the excessive amount of carbonate in the water and thought it would be a great expense to get rid of it by hand-picking and nitrogenous fertilizers. Fortunately, we discovered a weed-puller invented by a man in Santa Cruz from whom Miss Marion Hollins, with her usual foresight, bought the patent.

This weed-puller is shaped like a rake with large claws set at an angle so that it grasps the clover and other weeds but allows the grasses to slip through its fingers. With these weed-pullers we got rid of the clover on the first and ninth fairways in three days. One man and one weed-puller does more work than 15 men by ordinary methods.

In Britain we are not troubled with water problems, except too much of it, but in California and other American states the expense of upkeep and irrigation is a serious problem.

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Pasatiempo, where all the fairway watering can be done by one man.

A still more difficult problem is the effect of water used on the vegetation.

I have searched the bulletins of the Green section of the USGA and other resources but I can find little written on the subject. What the influence is from the enormous quantity of salt deposited on land from the growth of the different varieties of fescues, *agrostes*, *poas*, clover, weeds must also be considered. There can be little doubt that soft water derived from the peaty soils is the most favorable to the growth of the finer golfing grasses and the most effective in discouraging the growth of weeds.

At one time I thought it might be possible to put sulphate of ammonia or other chemicals into the water tanks, but found this was impracticable owing to expense and sundry other reasons.

It may be that I am attaching too much importance to the effects of salts in irrigation water, it is possible that all or most of the salts are washed down into the subsoil without having much influence on the roots of the grasses and that they would only have an effect if the water was more highly concentrated. It would be of great interest if the Green Section would

make further investigations on the influence of varying water supply on grasses and weeds.

Disease Treatment

Diseases of grasses are usually due to one of two causes, fungi or insects. The treatment consists in prevention and the use of poisons which will destroy the pests without injuring the grasses.

Prevention can often be obtained by sowing seed or planting stolons of grasses which are more resisting than others and also by using great discretion in fertilizing.

An excess of sulphate of ammonia may create a greater tendency to brown patch. Too much or too little water or the wrong kind of water may also tend to produce disease.

Fungi and even weed seeds may be carried on the boots of golfers. In England I knew a man, a member of the Brancaster GC, who told me that previous to joining it he never had any Brancaster weed (star plantain) in his garden. After playing golf at Brancaster it was his habit to walk across his lawn in his golf shoes. Along the whole length of his tracks a crop of Brancaster weed appeared.

At Pasatiempo we have reduced the cost of maintenance from \$24,000 to \$12,000 in

two years and now we are sinking our own wells and hope to reduce the cost to \$10,000 a year or less and I think all of you will agree that the condition of Pasatiempo compares favorably with any golf course on the Pacific Coast. I cannot emphasize too strongly the importance of economy in golf course maintenance. This is of special importance in these days of depression. It may be argued that it is economizing, men may be put out of a job, but the chief thing to remember is that unless we get cheaper golf there will be no new golf courses and existing ones may bankrupt and then everyone will be out of a job.

It must also be remembered that in getting cheaper maintenance men have more time available to carry out improvements on golf courses with a view of making them more pleasurable, popular and attractive to new members and so increasing green-fees. In this way every club would prove more prosperous. Popularity and financial prosperity are the acid tests of a good golf course.

I wish to again emphasize the value of greenkeepers to the health, the happiness

and I believe, the prosperity of the community.

Some years ago I was making a golf course which was financed by an old man, not himself a golfer. I was curious to know why he of all people had financed the construction of this course, so I asked him. He said, "During the War 12 of my clerks took up golf and they became so much more mentally alert and of so much greater value to me that I decided that golf had a great influence on the prosperity of the world and I determined to promote it to the fullest extent of my power."

Most people are agreed that golf promotes health and happiness but few realize the extent to which it promotes prosperity.

Golf and other games are also of great value in preserving the peace of the world. If the German energies had been devoted to games instead of the sport for training for war I doubt if the great World War would have taken place.

It would be a great thing if millionaires would leave their millions for the purpose of encouraging playing fields. It would certainly keep many people out of hospital.

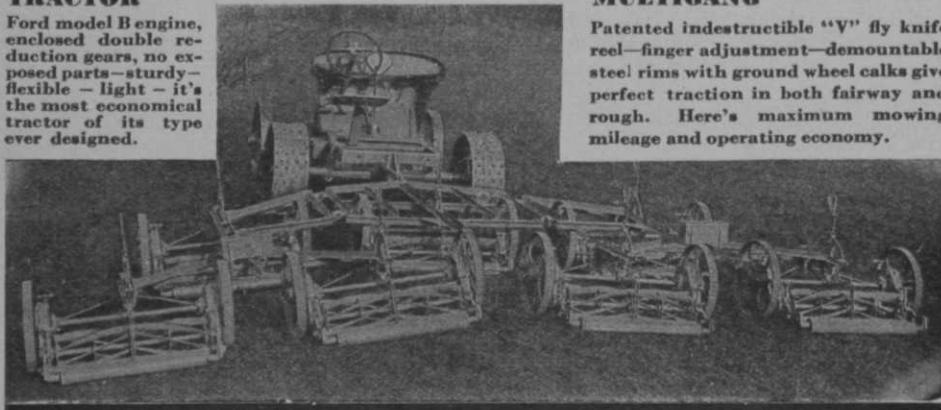
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