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week before or a week after the application of the manure. There is nothing to equal lime as a means of rendering sticky clay soils into a friable condition and as a matter of fact it increases the bacterial action and consequent nitrification in almost all soils.

In addition to the above general directions I might add one or two more of a general nature, but which nevertheless will return big dividends in this process of manufacturing top-dressing material by the soiling method. In a general way these added suggestions have to do with the question of soil texture. Let us say for instance that the soil type of this plot selected is sandy in nature, with a poor water-holding capacity. Under these conditions it will pay, if possible, to obtain a quantity of good clay loam top soil and cover the plot to a depth of one-half inch with the clay, disking it in to a depth of 3 inches. Under these conditions, by the addition of the clay soil to the sand you automatically change the soil type from a sandy loam to a *medium* loam which is always the most desirable soil type for the growth of fine turf.

If on the other hand you are cursed with a sticky clay soil plot for your soiling operations it will pay, if at all possible, to apply sand, as much sand as possible up to a depth of 2 inches and disk this in to a depth of 3 inches whereby you again automatically change the soil type from a stiff clay to a medium loam. It requires a lot of sand for this operation and many golf clubs will feel unable to stand the expense. In any event apply as much sand as you can afford. It all helps.

### Phosphorus Deficiency

So much for the question of soil texture. One other point with regard to preliminary soil preparation and I am done. I refer to the question of soil fertility. In general almost all soils are deficient in phosphorus and the amount of this element added to the plot as a result of the application of the manure is not generally sufficient to overcome this deficiency. Under the circumstances I would most certainly apply 500 to 750 pounds of 16 per cent acid phosphate per acre to the soiling plot, disking it in thoroughly and if you are located in New England I would also apply 200 pounds of sulfate of potash. Most clay soils contain sufficient potash so that if your soil is of a clay type it will in all probability not need the potash.

In the above discussion I have attempted

to give in a general way the main points of soil preparation for the soiling method of top-dressing manufacture. Remember that you can always obtain added information from your county agricultural agent or experiment station.

It will be fairly apparent to the thinking greenkeeper that there is a *method* behind all this apparent madness of plowing, disking, manuring, fertilizing, etc. As a matter of fact you are putting into that top 3 inches of soil everything which is necessary for the production of first class top-dressing material. All that now remains to be done is to give nature a chance to work up the raw materials in the upper 3 inches into such a condition that the resulting product is ready to be applied to the greens. This means that the lime will gradually loosen up the soil and render it friable, the manure will decay until it is incorporated with the soil and the resulting soil mass is rich as cream, readily run through a screen and capable of being applied to the greens with a minimum of manual labor.

### Disking Weekly

In order to expedite the rotting of the manure in the upper 3 inches of the soil it is advisable to run a disk over the ground about once a week. This operation opens up the soil thereby giving the soil bacteria every opportunity to attack the manure and reduce it to a well rotted condition and furthermore the disking operation keeps the weed growth in check.

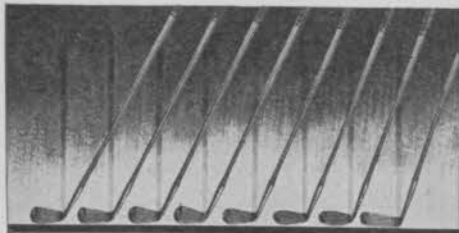
How long a period of time will be necessary for the rotting of the manure in the top 3 inches of soil will depend upon the temperature of the soil and moisture conditions, which again depends upon rainfall, but as a general rule 6 to 8 weeks is usually sufficient. The surest way to tell whether the soil is in condition for top-dressing purposes is to dig out a handful here and there over the plot and examine it for yourself. If the soil mass breaks up readily when rubbed in the hands and the small lumps of manure disintegrate when run through a sieve the soil is ready for top-dressing purposes.

### Don't Strip Too Deep

Now you will note in all the above discussion that I have discussed only the top 3 inches of the soil. I have done this deliberately because it is not advisable to take off more than the top 3 inches for top-dressing purposes. When you take 3 inches of top soil off a piece of land you still have 3 inches left which contains a



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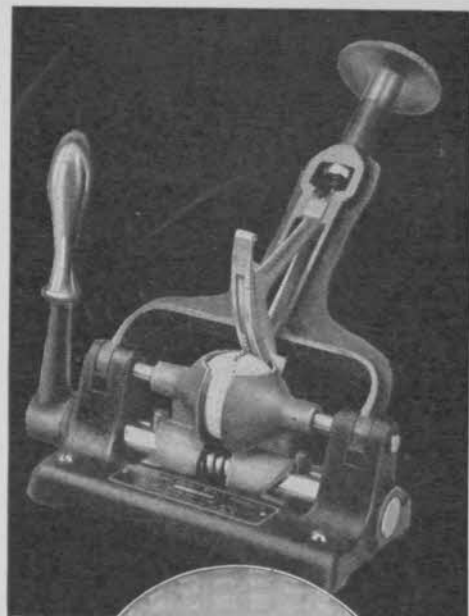
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sufficiency of soil bacteria and other organisms. You can now plow the soil to a depth of 6 inches and repeat the top-dressing manufacturing process all over again. If, however, you take off six inches of top soil at one operation you strip the land of practically all its soil bacteria and life and it is one hell of a job to do anything with it from that time on. Now, inasmuch as there is unfortunately a certain percentage of human hogs among the polyglot population of this grand and glorious country it follows that some few will take 6 inches of soil and leave nothing. I sincerely trust that such individuals will receive their proper share of hellfire in the hereafter. The vast majority will however confine their operations to stripping off the top 3 inches and otherwise act as reasonable human beings.

### Should Have Soil Shed

I need hardly add that all soil operations such as plowing, disking, stripping of the soil, etc., should be done when the soil is in a friable, workable condition. This is especially important when you are taking off the top-soil preparatory to running it through a sieve for application to the green. Wet, sticky soil is very hard to handle. For this reason every golf club should have a suitable soil shed where soil can be stored and the screening and preparation carried out during periods of rainy weather, and where the finished product can be stored and maintained in shape for immediate application to the turf. A suitable soil shed will effect greater savings in the cost of top-dressing golf greens than any other single investment on a golf course.

From a cost angle the preparation of top-dressing material by the soiling method is infinitely cheaper and quicker than by the compost pile system. In the first place all the labor of preparing a plot of ground by the soiling method can be conducted by machine, including the plowing, disking, spreading of manure, etc., and I am not at all sure that it would be such a tremendous job to fashion a rig for scooping up the top 3 inches of soil. Composting, on the other hand, is practically all hand work, and decidedly hard work as any one who has forked over a compost pile is fully aware.

The speed of decomposition of the manure in the upper 3 inches of the soil is much greater than the same manure in a compost pile, at least 4 to 1. Furthermore, the decomposition product in the case of

the soiling method is much more desirable because the decomposing action has taken place in an atmosphere abounding in oxygen with the result that decomposition is natural, complete and the ultimate product is free from toxins.

So much for the preparation of top-dressing material under those propitious conditions embodying a plentiful supply of manure. The same general system can be followed for the preparation of top-dressing when animal manure is scarce or entirely unavailable and I propose to discuss the soiling method involving the plowing under of green crops in lieu of manure in a future article. The green crop method is sound, simple and cheap but not quite as rapid in action as is the case when manure is available.

## Hold Mid-Summer Meeting at Arlington

*(Continued from page 24)*

as far with a given putt impetus on stolon bent as it did on other types of turf.

An extensive series of fertilizer test-plats lay alongside of the grass variety plats described above. The visitors were invited to gaze as long and ardently on these as they desired but it was noticeable that the Green Section technical staff did not go into any great length in discussing them or the results obtained to date. In fact the history of the ultimatums on fertilizers for turf reminds me of what Josh Billings said about the three stages of man, namely that an eighteen year old boy knows it all, at 25 he knows a hell of a lot less and at 35 he gets into the habit of going around to see his old man when he wants to get the low-down on anything in particular.

Next in order was the extensive area of plats devoted to experiments on control of brown-patch and other diseases. Monteith has been in tough luck this year in that there hasn't been nearly enough brown-patch infection at the station to make good experimental conditions. Never mind Doc, there's another year coming.

### Make Inspection Tour.

Shortly after noon the visitors began to drift back to Washington for luncheon and in the afternoon various groups embarked on visits to the leading golf clubs around Washington. The writer in company with three tried and trusted friends paid an extended visit to the Columbia C. C., one of

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the de-luxe clubs of the capitol. My three team-mates were—Oscar B. Fitts, superintendent of the Columbia Country club; George T. Cunningham, formerly of the Green Section staff, and now manager of 36 holes at the Country Club of Virginia, at Richmond, and Norman L. Mattice, superintendent of the Pine Valley G. C. at Clementon, N. J. I have always felt that these three boys deserve a great measure of credit in that despite the heavy handicap imposed by their respective college educations they have won through to a dignified success in the greenkeeping profession. Mattice says that it's a good idea

in the greenkeeping profession to knock on wood every morning before breakfast because nowadays the greens may look like a million dollars at 8 p. m. and a dime (Mex.) by 4 p. m.

In the evening we attended a healthy meeting of the Mid-Atlantic Greenkeepers' Association preceded by dinner. This is a young but enthusiastic organization and coming right along. The star performer of the evening was Mr. Hillman of the U. S. Department of Agriculture, who has spent many years in the study of the seeds of various bent grasses and in developing the technique of grass seed identification. He is now in a position to definitely distinguish between the seeds of these various bents and the information has been worked up into such form that it is available to seed analysts throughout the country.

### **Clearing Bent Confusion.**

Mr. Hillman's talk made it very clear that there was considerable of a mix-up in bent seed classification but that the mix-up was just about at that stage where it was ready to be cleared up as a result of technical study. A series of plats at the turf gardens labeled "grass sold as Washington bent" indicates that the mix-up in the various strains of stolon bent is equally as bad. In looking over these plats I confess that I had difficulty in selecting the plat planted to *true* Washington bent and could only be sure by inspecting the labels. No doubt the posted agrostologist or grass expert can tell the various strains but the average man is lost. Under the circumstances anyone contemplating the establishment of a stolon nursery will do well to use great care in securing his foundation stock of stolons otherwise he may wake up a year or two hence and find himself the possessor of a couple of carloads of Virginia bent or some other inferior strain when all the time he was kidding

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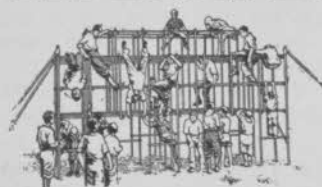
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himself that he had the true Washington or Metropolitan strain.

The co-operation of the green section and the Mid-Atlantic Greenkeepers' association in staging the day's events worked out very smoothly, there wasn't an idle moment and everything went off without a hitch.

In conclusion I cannot refrain from giving voice to my subconscious reactions to the Green Section turf gardens at Washington and the experimental work being conducted there. I am prompted to this course of action by the undercurrent of remarks—which I could hardly fail to hear at the meeting. There is a pronounced feeling in the greenkeeping profession that the work of the green section at Arlington is in danger of degenerating into a hackneyed and routine nature. In other words the work there is the same old story, nothing new. That this reaction on the part of the greenkeepers is reasonably justified cannot be entirely denied but I am wondering just how much the greenkeepers know of the situation in which the technical staff of the Green Section is placed at the present time and in fact for several years back. I make this statement because it has always been my experience that greenkeepers as a whole are a mighty fair bunch of sports and when they make criticism of any given thing it is either entirely justified or else they are not posted on all the facts. I am therefore going to take this opportunity of posting them as regards the true situation facing the technical staff of the green section.

As you all know it costs money to accomplish anything in this world and experimental work on turf is no exception. Monteith and his staff are slaving to make a decent showing with just about 25 per cent of the money they should really have for the purpose. I consider Monteith as one of the outstanding research men in today's turf work, but as matters now stand he is so tied up with routine jobs that he gets mighty little chance to tackle the sort of work he really should be doing. The same holds good for the other members of the staff. Of course you don't get any intimation of all this from Monteith but I have been in the technical game too many years to be blind to this sort of a situation and it is so obvious that it hurts. As matters stand today the Green Section is understaffed as regards technical men, the organization is underfinanced and consequently it is suffering.

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