

Results Show Value of Three Phase Fertilization

By B. R. LEACH

*"O father, I hear the church bells ring,
Oh, say, what may it be?"
" 'Tis a fog bell on a rock-bound coast"—
And he steered for the open sea.
—Wreck of the Hesperus.*

TWO or three years ago I attended the annual meeting of the Green Section at New York, and sat on a hard and uncomfortable chair for two hours while absorbing the series of addresses comprising the opening session of the meetings. If my memory serves me the program went something like this:

"What the Green Section Has Done for Me" By Mr. Wormwood Spatz, Chairman, Long Bar Harbor C. C.

"Why We Should Support the Green Section." By Cholmondeley Chubb, Chairman, Minnetooka C. C.

"My Experiences as a Green Chairman at Scrubb Oak." By Algernon Butts.

When twelve o'clock came around, physically and mentally exhausted, I dazedly wandered out into the lobby and ran into Riggs-Miller, who casually intimated that I had all the appearance of having been recently dragged through a knot-hole. Consequently I told this Beau Brummel of New York greenkeepers that I felt a recurrence of the old trouble in my left tonsil.

Grasping me firmly by the arm he led me to the elevator, we were whisked to the 16th floor and shortly found ourselves amid the elite of New York's greenkeepers and golf course supply dealers, holding in our hands a glass of what is known technically

by the odd name of "tonsil varnish." On imbibing of this "varnish," one notes the gradual but complete abeyance of all soreness in the tonsil, a slight thickening of the tongue, a complete sense of well-being and an added indifference to the vicissitudes and tribulations of the hour.

Amid these salubrious surroundings the talk drifted hither and yon, while the gentlemen of the turf recuperated from the exhausting effects of the morning's program and gathered strength for the afternoon session.

Questions One-sided Fertilizing

We shortly found ourselves listening to an impromptu and informal address by Mr. Riggs-Miller, his theme being the abnormal and one-sided nature of the present day (this was in 1928) system of fertilizing fine turf. I gathered that The Bishop did not agree with the contention that fine turf needed only nitrogen for its well-being, said contention being based on the theory that sufficient phosphate and potash were present in the soil for the needs of the turf with respect to these two fertilizing elements. He attributed the soft growth of our fine grasses during the hot months and the poor root development of our closely mown greens to the excessive use of nitrogen and the insufficient use of phosphates. He sketched the experimental work at the Rothamsted Experiment station in England and the results thereof in logical support of his belief. It was the consensus of opinion among those present at this august assembly of brains and talent that Mr. Miller had said a mouthful, in fact several mouthfuls.

In June of 1929 I spent a day at the Pennsylvania State Agricultural College at State College, Pa. This institution is beginning to delve into the mysteries of fine turf production and maintenance in cooperation with the golf clubs and greenkeepers of the state. At the time of my visit the turf plots were small in number as can be expected in the initial stages of turf

The writer, with no small degree of pleasure and appreciation, wishes to take this opportunity of acknowledging the many letters received from readers of GOLFDOM commenting on his article in the May number entitled "Green Plots Questioned."

investigations but there was one experiment which literally knocked me cold, in fact it might well be considered a classic among fertilizer experiments on turf from the standpoint of the significance one could attach to the results obtained.

This experiment consisted of four plots of grass of the same general makeup. Plot No. 1 received no fertilizer whatever and may be considered the "check or control plot." Plot No. 2 received nitrogen alone. Plot No. 3 received the same amount of nitrogen as Plot No. 2 plus phosphate. Plot No. 4 received the same as Plot No. 3 plus potash.

These plots had been fertilized in the early spring and in June (when I saw them) the comparison of the grass-growth on the four plots was exceedingly interesting. In Plot One the grass growth was stunted and meager. In Plot Two (nitrogen alone) the grass growth was much better than in Plot One. In Plot Three the grass growth was appreciably better than in Plots One or Two and the individual stalk of grass was much thicker and sturdier. The grass in Plot Four was best of all the four plots being heavy, thick and sturdy.

Needs Complete Fertilizer

The professor who had planned and carried out this experiment (unfortunately I cannot remember his name) had evidently done considerable thinking and calculating with regard to the result of the above experiment as evidenced by some of the pertinent statements he made while explaining the experiment.

The gist of his remarks were as follows: "Certain turf authorities constantly reiterate that, generally speaking, turf is adequately supplied with phosphate and potash and needs only to be fertilized with nitrogen. That such a statement is open to question is indicated by our experimental work and observation."

"The plots show that soluble nitrogen alone will stimulate the grass and cause it to make an increased growth, an increased growth that seems entirely satisfactory until you look at the plots which received nitrogen plus phosphate or nitrogen, phosphate and potash. When you examine all these plots carefully from a comparative standpoint you readily note that nitrogen alone does not give the *utmost* in strong, vigorous, tough volume of grass growth."

"In other words nitrogen alone is not a complete or balanced plant food for

grass. Nitrogen can only produce a healthy stimulation of grass when it is adequately reinforced or supplemented with sufficient phosphate and potash."

"Under the circumstances the only condition under which it pays to apply nitrogen alone to turf is when the turf is abundantly supplied with available phosphate and potash. To say that the turf of the average golf course and lawn in the east is adequately supplied with phosphate and potash is incorrect and putting it mildly if our observations and soil tests are any criterion."

"The vast bulk of fine turf in the east is low in phosphate and potash so that when you fertilize with nitrogen alone according to the present practice you do not get value received but worse than that you get a soft, sappy, weak-kneed grass growth that picks up every disease blowing across the course."

Checks with Other Experiments

"As a final observation based on these plots it is enough to say that the results are not of an amazing or revolutionary nature. Practically all the experimental work on the fertilization of farm crops of the past 30 years has shown that best results are obtained only when nitrogen, phosphate and potash are present in adequate amounts. If one of the three materials is not present in sufficient amounts the other two are handicapped and the crop suffers. In these respects grass is no different from other crops."

The luxuriant and persistent growth of blue grass in certain sections of the mid south has always been a source of intense interest to agrostologists, (grass experts). These particular sections seemed to be especially favorable for the growth of bluegrass. People thought it was the climate or something and despaired of ever securing stands of bluegrass in their own bailiwicks to compare with these favored regions.

Soil Analysis Shows Reason

Then just a few years back some of our shrewd experts began telling us that bluegrass needed rich soil to do its best, that acidity or lime was not the controlling factor, bluegrass was a gross feeder. It is a fact that bluegrass does better when planted in a rich soil but as a matter of fact the experts were still about three miles wide of the bullseye, just guessing.

It wasn't until one of the experiment stations sicked a clever soil technologist

onto this problem that the grass growing public began to see daylight and like most of the problems be-deviling the turf world the answer was disgustingly simple when brains were turned loose in search for the simple truth.

When these soil technologists got busy on the problem they made a great many soil analyses, talking samples of soil from fields where bluegrass was growing to perfection and samples of soil from fields where bluegrass was having a hard time to keep from slipping down into the slough of despondency.

When these technical sharks sat down in the office one rainy day, with their feet on the desk, cigarettes in their pans and otherwise giving the casual observer the erroneous idea that they were loafing, they compared the analyses of all these soils, and discovered an amazing fact, a fact which threw light on how to grow bluegrass.

The boys discovered that the stand and growth of bluegrass was always good when there was plenty of *available phosphates* present in the soil. In other words no phosphates, no bluegrass.

The Marquis of Milwaukee (the erst-while O. J. Noer) has the reputation of being able to make 17 blades of grass grow where only stunted bull thistles grew before. I understand that his system involves the use of his Milorganite PLUS phosphates. If that boy had only kept away from college he would be making \$50,000 a year right this minute.

Last but not least we find the Green Section, in a recent issue of the "Bulletin" receding from its previous stand that fine turf as a rule is sufficiently supplied with phosphate and potash. Dr. John Monteith, in the December number states (speaking of the results obtained in the demonstration plots): "There are indications that some readily available potash and phosphorous are desirable for grass in its first season."

Just why phosphorous and potash are needed by grass only in its first season and presumably not thereafter is more or less a mystery to me, and yet in turf journals we frequently find the statement that new seedings should be well supplied with these two fertilizing elements. All of which is entirely true but why confine applications of potash and phosphate to new seedings? The stuff doesn't last forever. In the space of a very few years it is exhausted from the soil and I venture to say that soil analyses of golf courses the

country over will show insufficient amounts of these two elements present in the bulk of established turf.

The present chaotic condition of fertilizer recommendations and practice in the turf business is more or less deplorable although virtually unavoidable. It is a deplorable condition because of the chronic controversy and disagreement on the subject with the resultant annoyance and expense to the fertilizer industry. It was unavoidable due to the restricted nature of the fertilizer research monopoly inadvertently, and undoubtedly unwillingly held by the Green Section for a period of years ending in 1928.

Green Section Gets Help

Up to within two or three years ago the Green Section was doing practically all the fertilizer research on fine turf in this country; at any rate if they were not doing all the research they were doing all the recommending of fertilizer applications.

That such a lone-handed service for research and recommendation by any organization would, in the long run, prove a deleterious influence upon the turf industry will hardly be questioned by intelligent observers in the realm of fine turf. Fortunately this exclusive burden of research on fine turf by the Green Section is now a thing of the past. Several of the state experiment stations are taking an active hand in fine turf research and there has been and will continue to be some active checking and rechecking of previous research and recommendations.

In the meantime greenkeepers and golf course officials will do well to keep their eyes peeled and centered on fertilizer research conducted not only by the Green Section but also by such state experiment stations as Pennsylvania, Massachusetts and New Jersey. A year or two ago the turf industry, its back to the wall, swung back to the use of lime. Now there is every indication that complete fertilizer (nitrogen, phosphorous and potash) will become the order of the day. Old man Progress hobbles along on crutches with one arm in a sling but thank God, he hobbles.

HIGH weeds in the rough should not be tolerated. Rough should be uniformly difficult; a player should not be penalized unduly because his wayward shot has the hard luck to come to rest beneath a bushy weed while his opponent, after an equally poor shot, draws an open spot of heavy grass.