What Research Is Doing, To Improve Turf

By FRED V. GRAU

USGA Green Section

A CHANCE observation of the effect of bordeaux spray on some weeds in a vineyard in France was the first recorded instance of chemical weed control. We have come a long way since. From that beginning we have learned to use various materials and have discovered their practical applications, their dangers and limitations. For instance, iron sulfate, widely used in British South Africa discourages certain weeds and improves the chlorophyll content of the grass blades, the vital factor in the making of food and the build-ing of dense turf. Chlorates have their place, but are unsatisfactory in many respects. Arsenicals have had a big place in turf, and they are going to continue to have a place in turf, because of the added advantage of the control of certain types of soil insects.

We are hearing a little bit about selenium compounds. You can now feed selenium to a plant and when the bug bites the plant the bug dies.

Now we have 2,4-D which controls many weeds, is neither poisonous nor a fire hazard, but which has certain limitations. Applied research is discovering how best to use this new material.

There is a lot of work ahead, and we must never lose sight of the fact that intelligent management can never be replaced by the mere application of a chemical so long as we are working with nature.

Our mercury compounds and all our complex organic substances represent distinct accomplishments in the control of diseases, but here again I want to call attention to a 3-way approach to that problem. One is the breeding of plants for disease resistance, a very, very fertile field; the further development of chemicals and their applications; and a thorough knowledge of nutrient balance in the turf field.

Here I want to call attention to the results of the late Dr. Haley of Penn State, who found that tobacco wildfire, which was threatening that industry, became non-existent when they had the proper nutrient balance between the plant and the soil.

How many of the diseases that we have to work with might be approached the same way? We do know, O. J. Noer has demonstrated many times, that the proper application of nitrogen can largely control dollarspot.

The fertilizer picture on turf is far from clear. We have done things a certain way, because it is the only way we had to do. The farmers did, too, but what is happening right here in the Midwest today? They are not putting on fertilizer like they used to. They are plowing it under the ground. They are putting it on the plow furrow. Why? Because there is where the moisture is, and when ears of corn were reduced by what they call firing in midsummer, it wasn't a moisture deficiency but lack of plant food. When they put the plant food under the ground where the moisture was, where the plant roots could get it, they increased their yield. The same thing is beginning to be done with turfs of different classes, but we have just barely made a beginning.

Why is that? What is the principle back of it? Evaporating soil moisture carries the soluble plant nutrient to the surface of the soil. The water goes on out. The nutrients stay on the surface. It is dry. The plant roots cannot use it. After a dry period we get a rain, and what happens? The grass just greens up overnight because of that large supply of available nitrogen right there in the surface carried down to the plant roots.

Some of you who have used tubular-tine forks on the putting greens find you get superior results because a great deal of the fertilizer goes down into those holes. Whether that is the answer or not, I don't know. It certainly has improved a lot of conditions.

Soil Modification Problems

This question of soil modification is not a specific problem. It includes a whole group of problems. We have made a lot of progress. You remember the discussions on charcoal and peat and on the excessive use of water. There is a lot of good work back of us, but certain requirements and certain principles are absolutely clear, that turf surface must be as nearly perfect as possible for the use for which it was intended, and in addition, the plant requirements must be met.

The modified soil structure, in addition,

must meet other requirements. On the putting greens we can't tolerate foot-printing. The greens have got to be firm, yet perfectly aerated and drained. An athletic field must be firm, and yet have deep enough roots and dense enough sod to withstand terrific punishment. All-weather turfed airfields must meet rigid requirements for load-bearing capacity, and in addition for growing plants. So the problem ahead with each type of turf is to bring about a correlation of the factors for moisture control, desired plant growth, and desirable surfaces for each specific purpose.

Among the hundreds and hundreds of grasses and innumerable strains of many turf species, we can make this statement: There is a purpose for every grass and a grass for every condition. Maybe we haven't been smart enough to find all of them yet, but somewhere in the groupof grasses in the world there is one to suit a purpose. We have had very encouraging results to date. We have selected a lot of strains out of Nature's own laboratory. That has been one of our most fertile sources of plant material. She selected them. Then we picked them up, increased them, and spread them around, and got superior results.

Grass Breeding Prospects

Plant breeders are hard at work on the grass family. Most of the emphasis in the past years has been on the crop plants or in the cereals, but the grasses are receiving a great deal more attention now, and out of that research for hay and pasture we are getting a lot of cast-offs that do not meet the requirements for tonnage, but they do meet the requirements for dense turf.

Those plant breeders who are working with grass have the know-how, and if they are given a specification for grass, the chances are they will be able to produce one, given the time and the money to work with. We have really got a great future in that respect.

In insect control, we have done a lot of work, but there is a lot ahead, too, with DDT on the horizon. It is not being recommended yet for many places. I picked up a recent issue of one of the chemical abstracts, and read of TDE, newer and better than DDT. It opens up a whole new field, and it is going to take a lot of study on the part of every one of us to keep up with those developments.

Irrigation research has been talked about for years. There has been a lot of talk about dual systems that would subirrigate and drain alternately. That is not out of the picture yet.

Soil and plant testing to determine nutrient balance is a very fertile field. How far we can go, I don't know, but there is a lot of work to be done because we must know more about nutrient balance because of its tremendous effect on disease.

Seed production of proven superior strains also is a big field. Unfortunately in the past there has been a lack of correlation in the turf field between the use areas and the production areas. We have taken what was offered because it was the only thing we had, but we are going to get our heads together, and we are going to say, "If you are going to grow seed for us, you grow what we want, what is going to do us the most good."

We haven't even begun to make uniform measurements for turf because most of us don't know how to measure turf. It is so different from anything in the agronomic field, where you can measure tonnages or bushels or pounds. Here we are measuring something entirely different, and we have not yet found that uniform method of evaluating results.

Certainly there is need of more adequate mechanization of turf. The labor problems that have beset you point to nothing else but complete mechanization with the minimum of manpower requirement.

What about the personal factor? That to me is one of the greatest factors in this whole industry. If we fail to evaluate that human element, we have missed an awful big bet. The practical applications of research will always be tempered by that personal factor. You give 10 men identical materials, identical instructions, and you will probably get 10 different results, and a large part of the difference will be due to the personal factor.

One of the neglected phases of turf work has been the dissemination of information. Unfortunately, many of us have our hands tied in that. We have not been able to get complete information out to all the people who need it. In a great many cases, particularly in some of the agricultural colleges, it has been easier to overlook that because it hasn't been a particularly important phase of agronomic work. That picture is changing, as I have said, because the public demand is such that they will have to give recognition to this phase of work.

There is an extension service in every state in the union but not all of them have taken cognizance of the importance of turf. Some of them have. That is one way in which results can be disseminated.

I think the county agent can be a significant factor in the dissemination of turf information, along with his other duties. Some of them are too busy. They can't do it. Some of them don't have the know-how or the inclination. We can't expect one hundred per cent, by any means, but the key back of that is the turf specialist at the college. If you have a real leader there, and a man with full information, he can do a lot to shape opinion and to determine the course of events. So I say that is the real key to this whole thing.

The need for advisory service is greater than it has ever been before. We realize it. When I went to Deltaville and saw that tremendous stack of information, scattered through so many volumes, I thought, how can we get that out? It is obviously impossible as it is. We should do the very best job of correlating all that information, bringing it together for each class of turf, bringing things up-to-date, and then we can go on from there, because when a man enters work in this field today he has to go back over a lot of material and he may draw some erroneous conclusions from earlier work that was published and has since been corrected. He may not find all of those references.

We look with pride upon the part that industry has played in this whole turf industry. Seedsmen, fertilizer manufac-

Canterbury All Set With Open Plans

TWO OF THE busiest men in golf these days are Edwin J. Hull and Walter Vetter of the Canterbury GC, Cleveland, Ohio.

Canterbury is the site of the forthcoming 46th Open Championship of the USGA, and Hull is chairman of the house operations committee as well as President of the club. Vetter is the club manager. Headaches for the two and their assistants began early last fall and will continue with them through tournament time, June 13th, 14th and 15th.

"I live right here in the clubhouse, but I'm so busy getting ready for the tournament that I hardly have time to say hello to my own wife," says Vetter, manager at Canterbury the past 11 years. He added, however, that despite shortages, "We will be all set to handle a record crowd and promise the visitors to the Canterbury championship hospitality as well as championship golf."

About 250 extra employees will be added to the Canterbury payroll the week of the tournament, according to Hull. There will be between 60 and 70 waiters, 5 extra cooks, 30 bartenders, 10 accountants, 25 cashiers and an undetermined extra number of maids, porters and locker-room attendants.

Lockers will be cleared of members' belongings and the locker room will be turned over to contestants, USGA officials, and turers, chemical houses, equipment menthere has been a fine spirit of cooperation in collaboration in the turf field in the future.

The Green Section has played a significant part in the development of the turf industry. From a small beginning 25 years ago it has grown to be the leading factor in turf development. Through an expanded and broadened policy of education, re-search and advisory service, the Green Section will continue to provide leadership, information and materials for the improvement of all types of turf. The going has been tough during the war. Food and military requirements came first. Reduced income caused many clubs to drop their membership. Personnel was at an extremely low ebb. Happily, those at the helm had faith and the desire to preserve intact the structure and the functions of the Green Section. Many of these dropped memberships are beginning to come in, which means that we can lend a great deal more assistance where assistance is needed.

members who are working on the tournament.

The club's grill room will be reserved for the exclusive use of the contestants and the sports writers. The remainder of the clubhouse, which will provide a seating capacity of 500, will be devoted to the use of members and their guests. All meals will be served buffet style with admittance whenever vacant seats are available.

Outdoor refreshment facilities will be connected to the clubhouse and even rain cannot interfere with arrangements for service. Tents housing sandwich, cold drink and coffee concessions will also be erected in the nursery and picnic grove near the 13th hole. A 250-foot bar will administer to liquid needs.

Luncheons will be \$1.75 in the dining room with a special in the grill for contestants and members of the press at a 50-cent discount.

No cash will change hands in the clubhouse or tents. Coupon books and strip tickets which may be exchanged for food and drink will be available at a number of booths spotted strategically about the grounds.

The press tent, 40 by 60 feet, will be set up on the tennis court near the clubhouse. This tent will be complete with scoreboards, of course, and tables, chairs and typewriters for 50 or more reporters. There will also be several telephones and telegraph outlets. Another large scoreboard will be located just west of the swimming pool in plain view of the gallery.