RESEARCH—A TOOL FOR BETTER TURF

by

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RESEARCH, of itself, does not provide better turf. Research provides many new tools, but it is the user of those tools, the golf course superintendent, who produces better turf for better golf.

The standards of golf course maintenance have indeed reached progressively higher levels. Why? Perhaps there is no single reason for this improvement. The demands of golfers for better playing conditions have had much to do with the progress. The willingness of golfers to pay for improved playing conditions has, for the most part, kept pace with their demands for improvement.

Then, perhaps, we ought to consider the fact that golf course maintenance in the United States has reached a certain degree of maturity. Pioneers in the business of maintaining golf courses will remember that standards of maintenance were not very high thirty years ago. The first golf courses in this country were maintained under the supervision of professionals or by greenkeepers who had come to this country from England or Scotland. Maintenance of turf for golf use in this country had no precedent or experience and it was necessary to borrow from the countries from whence golf came to us. We owe much to these men who came to us and contributed their knowledge and experience. Fortunately, the first golf courses in America were in the Northeast. The climatic characteristics of our northeastern states approach those of England and Scotland more nearly than do those of any other section of our country. For that reason, our borrowed information on maintenance worked quite well.

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New Problems

As golf has moved to all parts of the United States, new conditions have been encountered and it has been found that many new problems are associated with those conditions. The modern golf course superintendent in America, to be successful, must use knowledge and tools that were unavailable to his predecessors of thirty or forty years ago. We must acknowledge that much of the progress has been accomplished and many of our methods have evolved from trial and error. One of the greatest contributions to better turf for better golf has been the spirit of sharing knowledge and experience. This is the spirit fostered by the Golf Course Superintendents Association of America and by the many local superintendents associations. The profession would never have reached its present stage of maturity without this spirit of helpfulness and sharing. No amount of knowledge, experience, or new developments would have made so great an impact upon the excellence of golf course turf if the members of this profession had not been prompted

to share their knowledge and experience.

Now, let us consider another reason for the improvement of turf on golf courses, i.e., research. Research is rather difficult to describe in exact terms. It takes many forms. We normally think of basic or fundamental research and applied or practical research. We have a rather difficult time, however, when we attempt to place a bit of research in one category or the other. We are quite likely to find that research thought to be of fundamental nature today is of intensely practical importance tomorrow. Perhaps the most startling example we can mention is in the field of atomic science. Fifteen years ago, few of us imagined that by the year 1956 we would have submarines and electrical generators powered by atomic energy. Fifteen years ago, the nuclear physicists, with their theories and laboratory experiments, were thought to be indulging in the purest form of fundamental research. Yet, we realize now that we are on the threshold of an era in which atomic energy may be our major source of power.

Fundamental Research

We have no developments in the field of turfgrass management as spectacular as the development of atomic energy, but we have many examples of fundamental research having produced tools that are of great practical importance. Organic chemists, through pure research, have produced numerous fungicides and insecticides which have an important place in practical turfgrass management.

Practical or applied research is a little closer to our work than is basic research and we have a tendency to appreciate it more. It is the kind of research where one tests herbicides or other materials under a given set of conditions. The best material is found in a relatively short time and the information is ready to be put to work immediately. This kind of research can be done by a golf course superintendent and it is no less important in the overall picture than is the elaborate investigation of a highly trained scientist.

We like to think of all types of research as being parts of a factory for developing building blocks of knowledge. One type of research turns out a particular type of block while another phase of research develops a different type block of knowledge. We use blocks of knowledge of many different kinds in building a sound program of turfgrass maintenance. Because we build our programs under different conditions, we may not all use the same kinds of building blocks or we may use them in different proportions. Sometimes blocks of knowledge are developed prior to the time our building has progressed to the point where we can use them.

A good example is DDT. This compound was first described by a German chemist named Zeidler in 1874. It was not until 1939 that its insecticidal value became known. In 1943, the material began to be manufactured in the United States for use by the armed forces and became widely used as an insecticide about 1946. A period of 72 years elapsed between the time this addition to our knowledge was discovered and the time it found a place in the structure which represents our turf management program.

When we contemplate developments of this kind, we cannot escape the conclusion that the development of new information is worthwhile even when the newly discovered facts are not immediately usable. Sooner or later we are quite likely to find the place where these building blocks of knowledge can be incorporated into our structure.

Positive Contributions

Let us enumerate some of the positive contributions that research has made to the business of turf management in the last 10 years. We think that research produces results slowly, and to get a better measurement of progress we must pick out some reference point in time past. In enumerating the contributions, we do not differentiate between practical, "on the golf course" research, institutional research, and industrial research. All have contributed richly to better turf management.

NEW GRASSES: Merion bluegrass, Meyer zoysia, Emerald zoysia, Tiffine bermuda, Tiflawn bermuda, Gene Tift bermuda, T-35A bermuda, Pennlu bent, Penncross bent, and many other lesser known strains and varieties.

NEW FERTILIZERS: Urea-formaldehyde products and high analysis soluble materials.

NEW INSECTICIDES: DDT, chlordane, benzene hexachloride, aldrin, dieldrin, endrin, isodrin, methoxychlor, parathion, heptachlor, toxaphene, systox, and many others.

NEW FUNGICIDES: Cadmium compounds, new organic mercury materials, and complex mixtures of fungicidal materials for control of a broad range of pathogenic fungi.

NEW HERBICIDES: 2,4-D is a little more than 10 years old but many new formulations and methods of use have evolved in the last 10 years.
Potassium cyanate, phenyl mercury compounds, methyl bromide, disodium methyl arsenate.

NEW TOOLS: Aeration equipment, vertical mowers, power sod cutters, improvements in older standard items of equipment.

Somewhat less definite, but equally important, are the contributions to a better understanding of many standard practices such as irrigation, fertilization, cultivation, physical characteristics of soils, and thatch control. This list of improvements is rather impressive when we remember that it represents only ten years of progress. Any person engaged in turf management today would feel that he was working under a severe handicap if any of these tools were taken away from him. One could not provide the excellent golf turf that is demanded today if he were ten years behind the times.

If we were to use February, 1926, as our reference point from which to measure progress, the developments would be even greater. As a matter of fact, the Bulletin of the USGA Green Section for 1926 contains the address by Dr. R. A. Oakley, made at a meeting of the Royal Canadian Golf Association in Toronto on February 6, 1926. That was just 30 years ago. The title of Dr. Oakley's paper was "Contributions to Greenkeeping by the Trained Investigator." Dr. Oakley listed two general ways in which a trained investigator might contribute. These ways are: "(1) by exposing mysterious and fake practices and materials and doing away with honest but erroneous practices, and (2) by making discoveries in new lines." Fortunately, nowadays we have few "mysterious and fake practices" which need exposing. We believe that trained investigators are still "making discoveries in new lines."

Dr. Oakley's paper also sheds some light on the status of pest control in 1926. The following three paragraphs are quoted from his paper.

"Putting greens have their diseases and insect pests. Fortunately in Canada the notorious disease of putting greens called brown-patch is as yet not a serious problem. Southward in the United States it constitutes one of the most serious putting green menaces. Trained investigators are at work on it and already have done much in developing measures for its control. These involve the use of resistant strains of grasses, special fungicides, fertilizers, and the adaptation of certain of the features of culture common to greenkeeping.

"In the fight against earthworms and insects which injure turf, the trained investigator has helped and promises greater help. The improvement of the carbon disulfid emulsion method of exterminating grubs has assisted very greatly in solving the problem created by the June bettle, Japanese beetle, and others of their kind. Within a few days there will be published the results of three years' experiments which point quite clearly to the possibility of rendering the soil of putting greens immune to the attacks of earthworms and grubs by mixing with it certain substances that are poisonous to these pests but are not harmful to the grasses. Lead arsenate and sodium silicofluoride have been used very successfully in experiments, but a large number of others will be tried out thoroughly. This line of investigation promises much.

"Diseases and insect pests are serious enough, but after all are secondary as compared with weeds. When the earth was cursed to bring forth 'thorns and

thistles,' chickweed, pearlwort, crabgrass, and a dozen other putting green weeds were included with them. The weed problem is always before the greenkeeper. It is his Nemesis. Thus far hand methods have been his heavy artillery in the fight against nearly all of the important putting green weeds. Relatively recently, however, careful investigations have pointed to another and simpler method of warfare. In brief, it involves the systematic and continuous use of such fertilizer as ammonium sulphate and ammonium phosphate, nitrogenous fertilizers which tend to produce an acid condition in the soil. The explanation seems to be relatively simple. The best northern putting green grasses —that is, the bents— are able to thrive on soils that are regarded as highly acid to a much greater degree than can the weeds that compete seriously with them on relatively alkaline soils. Fertilizing to produce acidity in the soil, then, is the greenkeeper's hope in his fight against weeds in the future—not all weeds probably, but the most troublesome ones. This means that he must avoid lime or similar alkaline substances which have been used extensively either as soil amendments or fertilizers in the past."

Of course, we believe now that the theory of producing acid soils to control weeds was a faulty one. We believe you will agree, however, that pest control is easier now than it was thirty years ago today.

What of Future?

Thus far, we have considered the contributions research *has* made in the matter of tools for turf management. What of the future? Is research being done at the present time going to contribute to turf excellence in the future?

We believe the answer is "yes." There are approximately ten times as many investigators in the field of turfgrass research today as there were ten years ago. About half of the state experiment stations have some turf investigations in progress. There is a greater awareness of the value of turf than ever before. The individual who owns a lawn or the public authority which maintains a park area has a stake in better turfgrass management. As greater pressure is brought to bear upon state institutions in behalf of turf research, more effort is going to be directed to the solution of turfgrass problems. Much information that is developed as a result of this demand will be directly usable on golf courses.

There can be little doubt that research will continue to produce building blocks of knowledge or tools whereby a turfgrass manager can do a better job. Whether these additional tools contribute to better turf for better golf depends entirely upon the golf course superintendent. It is he who must take the building blocks of information that research develops and fit them together in the structure of a sound turf management program. Golf course superintendents have demonstrated that they are good builders throughout the history of golf in America. We will continue to have "better turf for better golf."

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