but it serves as a control of the operations and makes for better planning of the work.

There should likewise be a long-range plan for architectural changes in the course, in case any are considered desirable, and a long-range plan for turf improvement. Each year a decision should be made as to what part of these long-range plans should be incorporated into the budget.

A further requirement the Chairman should establish for the superintendent is that he keep himself well posted on all the latest developments in greenkeeping.

The superintendent should be a member of the National Greenkeeping Superintendents' Association and should when possible attend the annual meeting of this important organization. He should likewise join the local greenkeepers' association, keep in touch with his state extension services and attend all local greenkeeping or turf conferences.

It is also desirable that the Club keep in touch with modern trends in turf development by cooperating with local groups or with the USGA Green Section to carry on, either at the club or cooperatively with other clubs, any limited amount of research that might be recommended. Funds for these activities should be included in the budget.

It sometimes happens that a superintendent who is quite capable in all other respects will fail to take advantage of the services which are available to him through the USGA Green Section and the other organizations operating for his benefit. The Chairman can render no more complete service to his Club than by insisting that the superintendent take every advantage of these opportunities to better equip himself to carry on his work.

For his conscientious and sympathetic interest in his job, the Green Committee Chairman will be richly rewarded by his close identification with a fascinating study, to wit, the maintenance and management of outstanding special-purpose turf.

GREEN SECTION SERVICES

By FRED V. GRAU
DIRECTOR, USGA GREEN SECTION

Every USGA Member Club and Course and every Green Section Service Subscriber is entitled to Green Section services. Many who are entitled to the services do not use them.

The Green Section exists as a part of the USGA for the purpose of developing a national program of turf improvement designed to give Member Clubs and Courses and Subscribers more complete information on the subject of turf management.

Information is developed through a program of research at Beltsville, Md., and at 16 cooperating state and regional experiment stations throughout the country. Information is developed also through close cooperation with greenkeeping superintendents by observing successful practices.

The information is disseminated (1) through the USGA JOURNAL, one copy of which is sent free to each Member Club and Course and to each Green Section Service Subscriber, (2) through articles in other publications, (3) through lectures at turf conferences and meetings sponsored by cooperating groups, through correspondence and through advisory visits for which travel expenses and a service fee are charged.

The membership dues for clubs and courses and the Service Subscription dues for non-golf and commercial turf interests entitle the clubs, courses and firms to all services, at no additional cost, except advisory service visits. These services include (1) free advice by correspondence on any subject related to turf management, (2) identification of weeds, grasses or seeds, (3) expert and unbiased opinion on the most effective use of chemicals, seeds, equipment, water, fertilizers and so forth, (4) examination of specimens of soil to be used in building putting greens or other specialized

Visits by Green Section Staff to USGA Member Clubs and Courses

By JAMES D. STANDISH, JR.
PRESIDENT, UNITED STATES GOLF ASSOCIATION

Personal consultation service on greenkeeping and turf management matters by members of the USGA Green Section Staff to USGA member clubs and courses and to Green Section service subscribers is now available at $50 per day of service, plus traveling and living expenses.

This policy was established by the USGA Executive Committee at its spring meeting.

If several clubs or subscribers avail themselves of such service during one trip of a Green Section representative, the fees and expenses will be prorated among them.

Any such service to organizations not USGA member clubs and courses or service subscribers will be rendered at the rate of $100 per day, plus expenses.

It will be appreciated, of course, that the Staff does not have unlimited time for such engagements.

The Green Section will continue to give free advice and information by correspondence to USGA member clubs and courses or service subscribers.

turf areas (the Green Section cannot do soil testing; this service is available at all state experiment stations, some county agents' offices, commercial laboratories or through some fertilizer concerns), (5) distribution of samples of new grasses.

Advisory service visits by members of the Green Section Staff are available to all golf clubs and turf interests on the basis of (1) refund of travel expenses and (2) payment of service fee.

Green Section Service Subscriptions are available to all turf interests which are not eligible for USGA membership. These include all commercial interests which serve turf (seedsmen, fertilizer dealers and manufacturers, chemical companies, equipment dealers and turf nurseries), turf associations, greenkeepers' associations, bowling clubs, golf-course architects and builders, park departments, schools, ball clubs and others.

Service Subscription dues are the same as the dues of a Regular Member with an 18-hole course, $35.00 a year. This money goes into the Education Fund, of which 30 per cent is allocated to Green Section administrative expenses and 70 per cent to the establishment of cooperative research projects at various experiment stations in the United States.

The Green Section has been active in helping to organize local, state and regional groups and to assist them in organizing a turf program which will benefit all turf interests in the area. The Green Section staff coordinates research programs over the United States and aids in programming the various turf conferences and field days—in short, it serves as a clearing house.

Working in cooperation with the United States Department of Agriculture and with state experiment stations, the USGA Green Section offers unbiased, up-to-date information on all subjects related to turf management. Service is available not only to golf but to all turf interests.

Some of the outstanding contributions of the Green Section to turf management since 1921 are:

Development of the use of arsenate of lead on turf for insect and weed control.

Development of chemicals for the control of turf diseases.

Weed control methods.

Selection and testing of improved vegetated creeping bentgrasses.

Turf management practices.

Development of zoysiagrasses for turf purposes.

Development of Merion (B-27), a superior bluegrass.

Development of a national decentralized cooperative program of research and education in turf management.

Research projects now being sponsored by the Green Section are designed to answer many of the knotty problems facing us today. Results will be published regularly in the USGA JOURNAL.

COMPACTION, DRAINAGE AND AERATION

By M. H. FERGUSON

AGRONOMIST, USGA GREEN SECTION

The summer of 1949 was one of the most difficult seasons that many greenkeepers have experienced for the maintaining of turf. While the reason for the difficulty was most often considered to be weather conditions, observations made over a large part of the country indicate that compaction has been the major factor contributing to the loss of turf on greens. Many skilled greenkeepers are able to keep turf on their greens year after year in spite of poor soil conditions, but when a year like 1949 comes along, even the most highly skilled superintendent is hard put to keep his greens in good condition when any controllable factor is less than optimum.

Since 1945, one of the pet themes of the USGA Green Section has been *improved drainage and aeration.* Scarcely a turf conference has been held since 1945 which did not have on its program at least one paper pointing out the importance of good physical soil conditions together with good drainage and good aeration. The subject has been emphasized repeatedly here and in other magazines.

During 1947 and 1948 the Green Section effected a cooperative agreement with Saratoga Laboratories for the sole purpose of studying the physical soil factors associated with good putting greens and poor putting greens. The findings were reported in the USGA JOURNAL in June and July, 1949.

Inasmuch as many clubs have not taken steps to improve the physical soil conditions on their greens, perhaps it would be well to reiterate some of the principles involved.

Compaction of soil near the surface results from traffic of players on the green and from the operation of maintenance machinery. Some compaction of this kind is likely to occur regardless of the type of soil mixture used in building the green. This relatively thin layer of compacted soil can be broken up by regular spiking. Spiking may be accomplished by the use of hand-operated, hollow-tined forks or by the use of power-operated machines designed for the purpose.

A more serious type of compaction is that which occurs throughout the soil from which the putting green is built. This condition is built into a green by the use of a too-heavy soil mixture. This type of compaction can be corrected only by rebuilding the putting green and using a soil mixture which contains sufficient sand to preclude the possibility of compaction.

Compaction is detrimental to a putting green because of several reasons. First, a hard green is unacceptable from the players' standpoint. The greenkeeper is likely to over-water the green in an effort to soften it so it will hold a golf shot. Secondly, compaction interferes with the movement of moisture and air in the soil. Drainage is retarded and grass becomes unhealthy.

Another factor which contributes to poor drainage is layering in the soil. Any soil fraction used alone in topdressing a putting green will produce a layer. Such a layer will retard water movement by capillary action whether the layer be clay, sand or organic material.

Putting greens which are built on heavy soils require drain tile, a thick gravel blanket or both in order that gravitational water may be removed rapidly from the soil.

The above-mentioned drainage factors all pertain to internal drainage. Surface