Chicago Times photo

View of the completed USGA ball-tester. In background is section where ball is hit. Ball then travels through tube, interrupting two beams of light; the time interval is measured photoelectrically to give ball's speed. Ball then is snubbed down by baffle plates (nearest camera) and drops from machine.

USGA to Limit Ball Distance

GOLF ball distance is to be frozen by official ruling of the USGA which becomes effective Jan. 1, 1942. Studies in progress for almost 2 years at Armour Research Foundation, Chicago, under direction of Dr. Carl G. Anderson, will be continued until "a fixed measure of actual performance" is determined.

May 23 USGA officials and ball manufacturers met and at that time the USGA announced its intention to set a limit to golf ball distance unless objections were formally registered by manufacturers. No formal objections having been received, the USGA announced its decision June 2.

Flight of the ball will be limited, effective Jan. 1, 1942, "so that it will not be any longer than the so-called championship ball." Such flight, if obtainable by the vast majority of golfers, would be at least temporarily satisfactory, considering the ever-hopeful nature of the garden variety of golfer.

Fewer than a fifth of one per cent of active golfers compete in national championships sponsored by the USGA.

With limitation placed on distance of the ball, obviously putting will receive even greater emphasis in big-time competition. Therefore, the matter of maintaining greens in superb condition becomes accented more than ever by the new ruling.

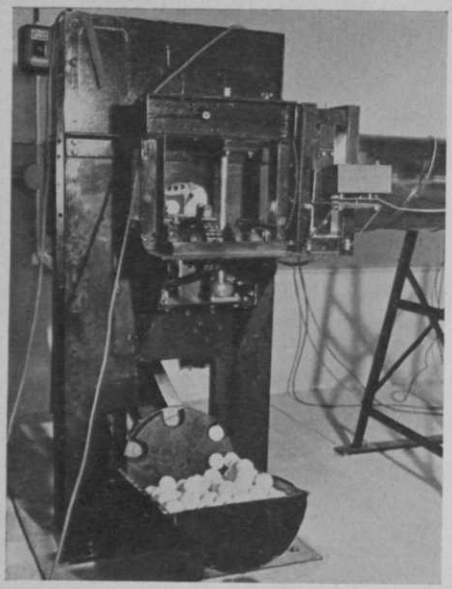
The USGA official release on the ball flight limitation, accompanied an invitation to the press to visit the Armour Research Foundation and see the USGA ball performance testing machine in operation. The USGA announcement:

Effective January 1, 1942, the United States Golf Association intends to include in its rules a provision limiting the distance qualities of the golf ball by providing for a fixed measure of actual performance.

The extent of the limitation will be determined after further study of tests made on the Association's new testing machine. This machine was completed a few months ago by the Armour Research Foundation, affiliate of Illinois Institute of Technology, Chicago, and was recently exhibited to representatives of golf ball manufacturers.

It is intended, in any event, to limit the flight of the ball so that it will not be any longer than the so-called championship ball.

The proposed check on performance would be in addition to the current regu-



Chicago Times photo
Business end of the USGA's ball-tester. Ball is lifted to top of machine, where clubhead on disk revolving at 1800 rpm's delivers blow equivalent to good golfer's swing.

lations governing size and weight of the ball, which now provide:

> "The weight of the ball shall be not greater than 1.62 ounces avoirdupois, and the size not less than 1.68 inches in diameter. The Rules of Golf Committee and the Executive Committee of the United States Golf Association will take whatever step they think necessary to limit the power of the ball with regard to distance, should any ball of greater power be introduced."

It has become increasingly evident that the above present regulations have not fully accomplished the purpose of limiting the distance qualities of the ball. Therefore, the Association intends to establish a test of actual performance.

Limiting performance will, it is hoped, accomplish several objectives which the Association has long had in mind and which should be of benefit to the average golfer as follows:

Checks Further Outmoding of Course

1. It should check further outmoding of golf courses as regards length. Thus, it should prevent clubs (and, therefore, their individual members) from having to pay more for golf on the score of re-designing and lengthening courses, which in the past has sometimes required purchase of more land, payment of larger taxes, and increased expense for course maintenance.

2. It should restrict the distance walked and the time required to play a round of golf to the point of the player's comfortable endurance.

3. It should result in greater emphasis on individual playing skill by promoting uniformity in the manufactured elements of the game.

4. It should tend to standardize golf and golf courses by controlling a factor which, if not controlled, could distort the whole game as now known.

Previously, in trying to reach these objectives, the Association's Executive Committee at one time considered adopting rigid specifications for all component parts and construction of the ball, as is done in some other sports. However, this approach was abandoned for many reasons, one of which was that it might tend to stifle beneficial developments in the ball. For example, it is conceivable that a ball could be made of materials other than those now commonly used and that such ball might be superior in some qualities to the present average ball and might be sold at lower cost. Obviously, prevention of such a situation would have been detrimental to the game.

So the Association ceased considering the possibility of having complete detailed specifications, and, instead, turned its attention to the one factor of limiting the actual performance of the ball, thus allowing room for sound progress along lines other than distance qualities. In 1939 the Association engaged the Armour Research Foundation to develop a machine to measure performance. It is this machine which is providing the basis for the Association's study of limiting distance.

Fits Ball to Courses

The Association believes that its current efforts will pave the way for maintaining desirable limits of time and distance for playing the game, thus fitting the ball to the existing golf courses, and will check the expensive and disruptive tendency of fitting courses to the ball.

The Association's driving machine consists of three units, each serving a distinct and separate purpose. The first unit is used to automatically "tee" the ball and then hit it with a blow comparable to that of a good golfer.

The second unit consists of a tube 12 inches in diameter and 15 feet long, through which the ball passes after being hit, and electrical timing equipment for measuring the speed of the ball. The passage of the ball down the tube interrupts two beams of light which are focused on two photoelectric cells. These beams of light are a known distance apart and the time required for the interruption of these beams is a measure of the performance of the ball.

The third unit is a receiver which ab-

sorbs the energy of the balls and drops them into a collector.

The performance of the machine is simple. Balls are dropped into a hopper and they are not touched again until picked from the collector. A ball is lifted from the hopper by a notched rotating disk which carries it to a runway. The ball rolls on to a moving chain which carries it to a pair of fingers. These fingers, which have very soft pads to hold the ball, are attached to a second chain which moves in front of the clubhead.

The clubhead is rigidly attached to a heavy disk which revolves at 1800 revolutions per minute and a linear speed of 145 feet per second. Through a system of gearing, the chain carrying the ball to the driving hammer is synchronized to the motion of the hammer so that the ball is in the center of the clubhead when it is hit.

After leaving the face of the clubhead, the ball passes through the tube. On its way to the receiver two beams of light are momentarily interrupted and it is this interruption which measures the time of flight of the ball through the tube.

Since golf balls are of varying degrees of hardness, it is necessary to take into account the trajectories which they make. Thus, it is possible for a ball to climb rapidly or for a different ball to have a low angle of climb. In order to have all balls break the beams of light, two mirrors are set up facing each other. A beam of light is focused on the first mirror which reflects the beam to the second and so on down the mirrors until the beam is finally focused on the photoelectric cell. No matter where the ball moves in the tube the beam of light is broken and the timing apparatus set in motion. A sensitive galvanometer is connected to the electrical measuring equipment, and by noting the swing of the armature coil which is produced by the interruption of the two light beams one can determine the time required for the ball to pass over a known distance.

The third unit consists of a series of baffle plates which absorb the energy of the ball and finally drop it into a collector.

The average time of flight for the ball to pass between the two beams is less than 0.045 seconds. With this machine it is possible to determine the performance characteristics of balls at the rate of one ball per minute. The machine is not used for production purposes but only for laboratory investigations.

New Bermuda Strains for South

By D. L. HALL

Greenkeeper, Savannah (Ga.) GC

PROBABLY in no other section of the country are there such diverse opinions about greenkeeping methods as in the South. The variety of climate, particularly with respect to the winter season, and the great diversity in soils may be responsible. In the extreme South winters are balmy and bermuda stays vegetative all winter; farther north it goes off color with the first heavy frost and stays dormant until warmer weather appears in early or late sping.

There are outstanding differences in the playing quality of greens. In the main these differences are due principally to maintenance practices. However, in no case does the greenkeeper in charge feel himself duly rewarded for the amount of effort put into them. Failure to achieve really good putting quality is due to inherent limitations of common bermuda grass. Leaf blades and stems are altogether too coarse for putting green use.

As a rule it is customary practice to topdress heavily at rather frequent intervals to bury stems and to fill cavities. In this way surfaces are kept reasonably smooth. Enough nitrogen is used to encourage growth of young shoots and new leaves. Even so, despite every effort greens are rather slow and are nothing like bent greens or even the South's winter greens which are seeded with rye.

The limited possibility of bermuda grass prompted me in 1931 to start what later turned out to be a fascinating series of experiments. Instead of trying to grow bent grasses, I decided to search for a more suitable bermuda—a dwarf variety, so to speak; in other words one possessing finer textured leaves and a more compact habit of growth. This looked feasible because the bermuda in some of the very old greens at our club was definitely superior to common bermuda in every respect.

My first thought was to make selections of the most desirable strains and propagate