

Jim Reynolds (left) and Alex McIntyre assisting in the clubhead speed tests, conducted in the G-E laboratories.

## Pros Join With Scientists in Tests of Club and Ball Speed

By J. K. THOMSON and C. S. McBRIDE

**R**ECENTLY THE General Electric Co. announced a device to measure the speed of a golf club at ball impact. The device was developed by H. W. Lord, vacuum tube engineer, and employs two photo-electric beams. The apparatus developed includes two phototubes and light sources arranged 6 inches apart, with the beams running at right angles to the path of the club and line of flight.

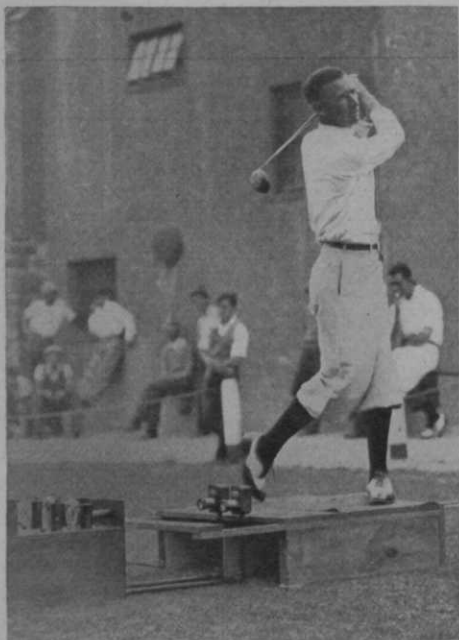
As shown in the accompanying photos, the club is swung from a platform. The ball is teed up so that the driver cuts the first beam a split second before it strikes the ball and almost immediately afterwards cuts the second beam. Both phototubes operate thyratron tubes, the first one causing a condenser to begin charging and

**T**HOMSON and McBride, prominent officials of the Upstate New York PGA, who participated in General Electric Co. tests of clubhead speed at ball impact, give here the first full report of these interesting tests and venture some conclusions.

Following their material is data on the test of golf ball speed made at the Packard Motor Car Co. testing grounds with Gene Sarazen driving the ball and Col. J. G. Vincent driving the automobile.

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the second one stopping it. The resulting voltage charge across the condenser is measured by a meter, which is calibrated



Outdoor test of the photo-electric device. The player is James Thomson, pro, Mohawk G. C. (Schenectady).

in terms of miles per hour. The calibration can be altered for much slower or much faster speeds, and it is possible to measure speeds up to about 1,000 miles per hour with the device.

The speed of those who have tried the apparatus ranges all the way from 50 to 130 some miles per hour. It has been contended pro and con that lightness rather than weight in the clubhead contributes to the higher rates of speed. Another question, that relating to the whippiness of the shaft, has crept in and the authors of this article have endeavored by a special series of tests to establish some facts relating to the importance of clubhead weight, length and whippiness of shaft. The results recorded herewith can not be considered conclusive since the tests were limited and only imaginary balls were hit. However, they are revealed for such interest as they may be to instructors, professional club-makers and manufacturers.

Much more reliable data could be gathered and some real conclusions reached if this machine could be implanted in the ground (not a difficult set-up) so that actual driving conditions could be duplicated. Then tests could be conducted and both speed and flight noted so that some

tie up between clubhead speed at hitting and distance could be made and average distances found for various speeds.

### Conclusions by J. K. Thomson

Results of the tests as interpreted by J. K. Thomson, pro at Mohawk G. C.:

'Being at a loss in scientific research work, I readily admit that inferences indicated by the tests recorded here may not be of importance under real driving conditions. The period of tests were very limited and, as remarked, the machine's real worth could only be established under regular playing conditions. I found in an outdoor demonstration for the news reels that I got speeds that I later could not duplicate in the laboratory.

"Referring specifically to the tests, the following items were observed—

"1. Each golfer got higher speeds with hickory and limber shafted clubs.

"2. The slight change in clubhead weight did not seem to figure in.

"3. Where golfers tried more than two swings without a rest their speed decreased. I believe that this was due to the desire for increased speed and consequently caused pressing. This has a definite relation to actual playing conditions, where pressing for greater distance usually nets poorer shots and less distance.

"4. The group of golfers tested ranged from a good player to one who has never hit a golf ball. By checking the speeds of "Golfer D" with the others it will be observed that he obtained unusually high speeds for a novice. However, his swinging style readily indicated that on a tee he would have a terrific slice, if he was lucky enough to even hit the ball.

"Therefore, one conclusion can be made and that is that the mere passing of a club through the beams of light with its resulting speed does not necessarily mean a well hit ball.

"My guess from observation is that the average player or 100 man has a driving swing speed of about 65 miles per hour. The good driver's speed is in the neighborhood of 85 miles and the real driving champions have a swing speed of about 125 miles per hour.

### Points Need of Tests

McBride comments on the General Electric tests:

"Witnessing and taking part in these limited tests brings home again the desirability of a PGA testing institute or test-



Sarazen's drives travelled as fast as the speeding car in this test at the Packard proving grounds.

ing committee. Here is just one of the many ways the PGA could make itself of real importance to golfers throughout the country and at the same time render a real service to the profession.

these tests with this particular device are of little value to the average club swinger. Even so, the information found thus far puts the professional in a position where he can without fear of contradiction be assured again of the old thought, that speed

"It may be assumed that the results of

LABORATORY TESTS OF CLUBHEAD SPEED

Swing	Type of Shaft	Length Ins.	Weight Oz.	Miles per hr.
Golfer A—				
1	Graduated Steel .....	43	13¼	77.5
2	*Graduated Steel .....	41¾	12	95.0
3	*Graduated Steel .....	41¾	12	80.5
4	Torsion Steel .....	43	13½	75.5
5	Hickory .....	43	13	80.0
6	Hickory .....	43	13	80.0
8	Very limber .....	43	13¼	85.0
9	Very limber .....	43	13¼	95.0
10	Very limber .....	43	13¼	84.0
Golfer B—				
1	Graduated Steel .....	43	13¼	82.5
2	Hickory .....	43	13	102.5
3	Very limber .....	43	13¼	110.5
4	Very limber .....	43	13¼	110.0
5	*Graduated Steel .....	41¾	12	70.0
6	*Graduated Steel .....	41¾	12	90.0
Golfer C—				
1	Graduated Steel .....	43	13¼	59.0
2	Graduated Steel .....	43	13¼	59.4
3	Hickory .....	43	13	61.0
4	Hickory .....	43	13	67.0
5	Very limber .....	43	13¼	71.5
6	Very limber .....	43	13¼	75.0
Golfer D—				
1	Graduated Steel .....	43	13¼	70.0
2	Hickory .....	43	13	82.0
3	Very limber .....	43	13¼	85.0
4	Very limber .....	43	13¼	92.5

\*Standard Ladies' Club.

at impact rather than brutal hitting strength is an essential element.

"During the past few years many devices for testing golf clubs, balls and so forth, have appeared. Most of the devices used are now in control of various individual manufacturers. However, should the PGA start a program of testing and approving golf equipment it would not be long before a real good line of testing apparatus could be assembled for use. As a starter, I believe that co-operation of such unbiased companies as General Electric would be forthcoming and at little or no expense.

"To set up a testing institute somewhat in line with *Good Housekeeping* would be a big task and require several years of real effort with full cooperation of the leading golf goods houses. Even so, a start is something—in fact is the most difficult part of all undertakings and if our association with its wealth of high class members cannot make a start, then the whole idea of a testing institute so ably put forth by a writer in GOLFDOM earlier this year must die a natural but sorrowful death."

#### 4.5 Seconds for 230 Yard Drive

Tests conducted by Gene Sarazen, Alvin Macauley, pres., and Col. J. G. Vincent, v. p. of engineering, Packard Motor Car Co., lacked the photo-electric measurement of the General Electric tests. Stop-watch timing at the Packard proving grounds indicated that the ball leaves Sarazen's driver at the rate of 130 miles an hour. Inspection of the super-slow motion instruction pictures made in 1930 by the PGA indicated the ball's speedy leap from the clubhead and as near as can be determined by pro golf investigators, the PGA pictures check with pro tests at the General Electric and Packard establishments.

Timers with stop-watches were placed where the car came abreast of Sarazen and along the track. Some timed the ball; others the car. Timing of Gene's swing was judged and after several trials Col. Vincent driving his Twin-six speedster synchronized the car and the swing. Driving out of an almost perpendicularly banked turn into the straightaway at a speed of 120 miles an hour, Vincent's signal for starting the swing was so perfectly caught by Sarazen that the clubhead met the ball as the car crossed the starting line.

Not one of the drives made by Sarazen varied more than a foot in distance. They

averaged 230 yards. On the first drive it took the ball 4.5 seconds to make the 230 yard flight. The car made the distance in 4.1 seconds. Each time the car beat the ball for the distance by 4/10 second. For about half the flight the ball led the car.

Gene concluded that the clubhead must have been traveling somewhere around 115 miles an hour at impact. It will be noted that the fastest time shown on the photo-electric tests is 110.5 miles per hour and with a very limber shaft. Maybe Gene guessed his clubhead speed too high, or it may be that his high speed is part of the answer to two national open championships this year.

### Pro Vet Notes Scores and Sales Keep Step

**E**LMER LOVING, veteran professional, observes that the far greater part of golf equipment bought by players who shoot 85 or better is bought from pros. Consequently, reasons Loving, it is greatly to the advantage of the pro to see that his players are so taught that they score well.

"The poorer golfers make up the greater part of the store trade and go for the 'Christmas jewelry' type of club," observes Elmer. "They go out to play and notice that the fellows who are getting the most fun out of the game are those who are scoring well. It also comes to their attention that the reason these other fellows are scoring well is because the pro is giving their games some attention. It's only human nature to take an interest in the fellow who is a customer of yours rather than a customer of a competitor, as the store purchaser quickly realizes. His next clubs, then, he buys from the pro.

"The same principle holds good in other lines of merchandising. A man buys a Cadillac because he expects service, but he expects it on his Cadillac purchase from the Cadillac dealer and not from the Packard dealer.

"It's not any fairer for a club member to expect pro service to purchasers of store goods than it would be for the Cadillac owner to expect interested and expert service from a Packard dealer; except with the idea of showing up the competitor's product and making a replacement sale.

"When the pros put across the idea that advisory and instruction service follows-up all of their sales they won't have much complaint about store competition," concluded Loving.