

course or at some private clubs. I do not know what effect it may have in years to come, but I am inclined to think it will be most favorable. With this plan I have eliminated class lessons and bargain series. I am a believer in class lessons only in schools.

Now, when it rains, or is too hot, or too cold, it gives me ample time to check my stock, rearrange same, or catch up with some correspondence. There's no longer the thought that I'm losing out on some needed money, just because of the weather. I did not have to specify that this plan was contingent on so many les-

sons because I had most of them lined up before my letter went out, but it may be well to give this some thought.

I am taking pictures of my pupils with the purpose of aiding myself. This should also be interesting to the pupil. Then at the end of the year I can show a decided contrast in results from start to finish. Possibly, too, these pictures will make a swell feature at some party.

I might say that I expect to increase my sales of merchandise; in fact, the plan has already shown its effect in increased sales of equipment.

## Flash Photo Analyses Give Instruction Pointers

MUCH scientific data of value in teaching has been brought to light by flash photographs taken at the research laboratory of A. G. Spalding & Bros. Pictures of a golf ball being hit, for instance, plainly indicate two things, among other points:

(1) The player who says he sees the ball being hit, is no more seeing the exact contact than he sees lightning as it flashes. The action is far too fast to be seen as it occurs.

(2) The player who thinks he gets a deliberate hook or slice by tricky hand action at instant of contact is kidding himself.

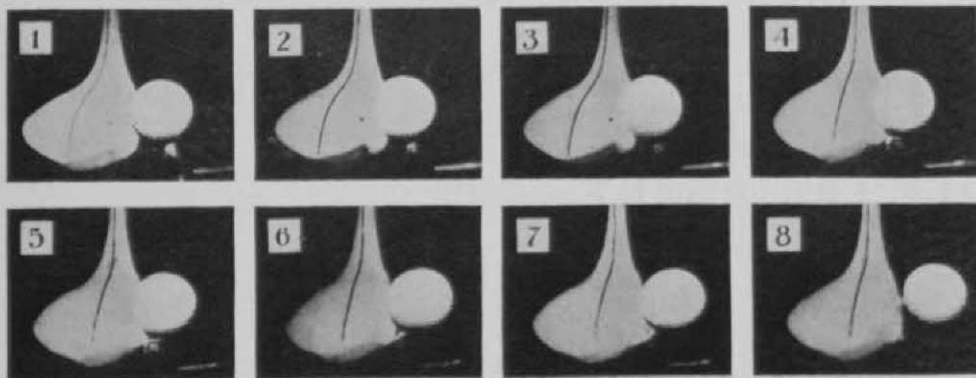
Duration of contact of wooden head and ball is 4/10,000ths of a second. Try to do any tricks in that brief period.

Another point that stands out in the flash pictures of the ball being hit is the

terrific strain to which ball construction is subjected. The pictures show the wisdom of paying enough for a ball so it can withstand, especially in its internal construction, the beating that it gets.

Ball pictures were taken with the club being swung by a driving machine that propelled a Spalding Dot approximately 250 yards.

Notice that the ball reaches substantially its maximum flattening before its front edge moves at all. Notice, too, that as the ball is compressed horizontally, its vertical diameter elongates, and similarly, as it reacts from the compression, in leaving the club, the horizontal diameter is stretched, and the vertical shortened. These pictures provide valuable clues to the stresses to which the interior of the ball is subjected.



From other similar photographs made especially for quantitative measurement, the following interesting facts have been determined:

For the contact pictured here:

- The total duration of contact was .....0.00040 secs.
- Time of compression was .....0.0002 secs.
- Time of decompression (restoration of ball) was .....0.0002 secs.
- Backspin (Loft of club 12 degrees) at rate of .....4800 revs. per min.
- Velocity of ball leaving club was .....238 ft. per sec. (or 162 mi. per hr.)
- Velocity of club before impact was .....162 ft. per sec.
- Velocity of club after impact was .....125 ft. per sec.
- Diameter of ball at rest (standard) .....1.68 inches
- Maximum diameter of ball was .....1.78 inches
- Minimum diameter of ball was .....1.56 inches
- During contact face of club moved .....0.35 inches

Bob Jones, director of Spalding's "The American Golf Institute" comments on flash pictures of his own and an "average" player's swing. No mention of the 'average' player's handicap is given in the comment which accompanies the pictures. The swing pictures were taken at the speed of 50 pictures a second, and indicate that approximately 1 1-5 seconds are used for the swing of the "average" player. Jones' swing requires about 1 2-5 seconds.

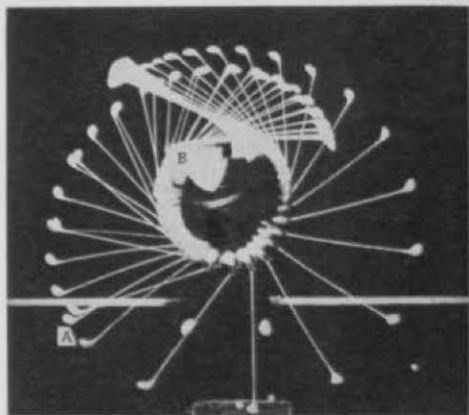
Of the swing pictures, Bob notes:

Swing 1 is that of an ordinary golfer. Swing 2 is mine. "A" in each swing indicates path of backswing and "B" the topmost hand position in the backswing.

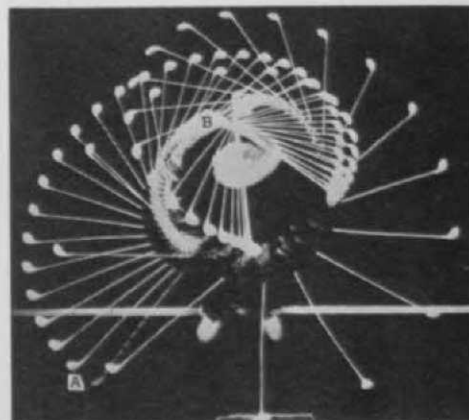
The following points are of interest:

- (1) The arc of the backswing in 2 is much wider than in 1. This is brought about by a more complete extension of the left arm.
- (2) This extension plus a more effective wind-up of the hips brings the hands at "B" noticeably higher in 2 than in 1. The position in 2 is one of greater potential power.
- (3) The loop in the path of the club-head as the swing changes direction is

apparent in 2 and absent in 1. In 2 the plane of the downswing has dropped away from the camera so that the clubhead may



Swing 1. Showing the "average" golfer's swing pattern



Swing 2. Showing Bob Jones' swing pattern

be brought upon the ball from inside the line of flight. The radius of the downswing has been further shortened by the retention of almost the full angle of wrist-cock during the early stages.

(4) In the second half of the downswing, in swing 2 the intervals between successive club positions are greater than in swing 1 because the uncocking of the wrists in this area contributes to continually increasing clubhead speed.

(5) In 2 the player has relaxed after making the hitting effort and has allowed the momentum of his swing to carry his club well around his neck at the finish. Swing 1, being much shorter after impact, indicates that this player is still feeling tension.