



*"Air line" distance is the proper way to measure a golf hole. Lynn Smith looks on as Bill Bryant zeros in on the 'rod man' on the green.*

## Measuring Courses Accurately

by LYNN A. SMITH

In order to promote national uniformity, the USGA has adopted a new Course Rating System which places almost total emphasis on yardage. In the initial announcement that a new Handicap System was being adopted, the USGA made the following statement:

"Yardage is the prime factor in rating comparative difficulty of holes and courses; in many cases, yardage is the only factor. Therefore, the USGA urges accurate measurement of every course."

The USGA Yardage Rating Chart for men is based upon three primary points: a hole 175 yards long is an even 3 par; a hole 375 yards long is an even 4 par; and a hole 575 yards long is an even 5 par. If these points be established on graph paper, a straight line drawn between them will establish all other points on the chart,

and it will be found that each 20-yard segment will result in a change of one-tenth of a stroke. The spread on the Yardage Rating Chart for women is 18 yards.

### *Needed: Accuracy*

This makes accurate measurements to the nearest yard of great importance. A small error in measurement could throw the hole into the next higher rating, increasing it by .1 of a stroke, and repetition of such an error could distort the course rating. The necessity of accuracy is stressed in Section 16 of the **Golf Committee Manual and USGA Golf Handicap System with USGA Course Rating System** which has been revised as of January 1, 1967. This is required reading for anyone interested in course rating.

This manual stipulates that each hole shall be measured horizontally (air line) with steel tape or surveying instruments from the permanent rating marker to the center of the green along the planned line of play (usually down the middle of the hole). The suggestion is made that the measurement be made by competent authority, preferably by someone with knowledge of civil engineering. Knowledge of golf courses and how they are intended to be played would seem to be of equal importance.

#### *A Rating Committee at Work*

Bill Bryant and Harold Dawson have measured many courses for the Course Rating Committee of the Southern California Golf Association, and some of their procedures have been refined by practical experience over the years.

No course should be rated until a permanent rating marker has been installed at the side of the tee, preferably on the side nearest the green of the preceding hole where it may be observed by players walking onto the teeing area. Where the teeing area is long enough, markers are set for Championship, Regular, and Senior tees in the middle of the area commonly used for each type of play.

A measurement is made on every hole from the back of the tee to the Championship marker, to the Regular marker, to the Senior marker, and to the front of the tee to define the possible variation in yardage which can result from tee



*The steel tape, though an arduous task, is still one of the "recommended" methods for accurately measuring the course.*

marker placements. The length of the green is also measured in yards, and after the distance from the front of the tee to the front of the green has been determined it is possible to develop the yardage from any point on the tee to the front, middle, or back of the green.

Normal playing conditions are essential when a course is to be rated and this is the reason for multiple measurements to define possible variations. Frequently the Green Chairman or Superintendent will set the tees back and estab-



*There is only one way to measure a golf hole of this kind accurately. The steep bank and lake below make the use of surveyor's instruments mandatory.*

lish difficult pin sets to impress the Rating Committee without stopping to think that a higher rating will penalize his members by decreasing their handicaps. This is why it is so important to measure from the middle of the teeing area to the middle of the green and establish a yardage rating for the hole which disregards any temporary variation in distance or difficulty.

### *Tools of the Trade*

A stadia, which is a version of a transit, is used for measuring, and the measurements of a reasonably level 18-hole course can be developed in about two hours with the use of this instrument. This requires one man on the instrument and another on the rod. A walkie-talkie radio is helpful for communication between them. For simple measurement of distance, some practice with the instrument and a comprehension of the necessary conversion charts is sufficient to develop a very precise figure for course yardage. The cost of the measuring equipment is approximately \$250.

Measurement of level areas, such as tees

and greens, can be expedited by use of a wheel in the hands of an experienced and careful operator. Comparisons of distance determined by steel tape, transit, or wheel on a level paved area approximately 200 yards long resulted in variations of inches among the three methods. The wheel registers two yards for each revolution on a counter and gives a faster result than other methods for the simpler measurements. However, it is subject to inaccuracies where the ground is not level.

The wheel can also be used for checking results obtained by other techniques. Where there are not too many problem areas, measurements for 18 holes can be checked in a little over an hour by the use of a wheel and an automotive cart. Obviously, however, it is of no use where a measurement must be made across a lake or some other obstacle, or where the distance must be measured from an elevated tee to the center of a green lying below. Actually, a 440-yard hole with two swales was measured by transit and by wheel with a variation of about one yard, and the comparative accuracy of the

*In the hands of an experienced and careful operator such as Bill Bryant, the wheel may expedite measurement of small, level areas such as tees and greens. Harold Dawson, Southern California Golf Association, looks on from the cart.*



*Two-way radios simplify and expedite the communication problem while measuring the golf course. Bill Bryant and Forrest Perriguy think they are a 'must' item for the team.*



two methods has been cross-checked in many other instances. Either method must be done carefully and the margin of error should be no more than this, which is far below 1%.

#### ***Radar; In the Future?***

A radar method of measurement is also being studied, and this shows great promise. This involves bouncing a radio beam off a target and measuring elapsed time for its return. Technically this is already practical, but equipment cost is still exorbitant.

An article in the August 1958 **USGA Journal and Turf Management** suggested the use of aerial photographs to determine course measurements. While scale maps made from such photos are of great value for planning changes in the course, for computing management areas, and for many other uses, there has been some question raised about the degree of accuracy which can be attained throughout the entire course. Possibly errors resulting in differences in altitude from varying ground levels and from distortion caused by minor differences in lens angles suggest ground measurements may be simpler and more nearly precise.

#### ***Judgment Now***

Regardless of the technique used, judgment must be used in some cases, particularly where a dogleg is involved. Here the measurement should be taken as the hole is intended to be played, regardless of whether some golfers might wish to gamble by taking a short cut to lessen the distance. Good course design always dic-

tates that the risk shall be high.

Yardage figures must be correlated with playing conditions. Thus the trajectory of a ball hit from an elevated tee will make it carry farther than the yardage might indicate. Two parallel holes of the same length, one uphill and the other downhill, will play differently. However, most courses have as many holes going up as down, as many holes with the prevailing wind as against it, and as many open holes as those closely trapped. It would be very exceptional for the overall adjustment of the yardage rating to be greater than the one-stroke maximum specified in the USGA system.

#### ***Precise Yardages***

Application of the new USGA system is the responsibility of the district golf associations throughout the country, not of the individual clubs. It is essential that these associations insist upon an accurate remeasurement of every course to be sure that yardages are precise enough to make it possible to assign a meaningful course rating. It is probable that many courses have not been measured for many years in spite of changes which may have been made or errors which may have existed in the original survey. If this remeasurement is done, greater uniformity will result since all clubs will be on a fair comparative basis. The influence of differing views by different Rating Committees will be reduced to a minimum since yardage will be the prime factor in evaluating the playing difficulty of the course.