



Fairway badly in need of lime and fertilizer. Note thin, weed infested turf.



Unfertilized Blue grass fairway showing heavy infestation of dandelion.

when the club head strikes hard, bare soil is terrific. The impact almost knocks the club out of the players' hands. Some golfers think a heavy dressing with sand is the answer because it is easy to play a shot when the ball rests on light textured soils, such as sands and sandy loams. Sanding solves the player's problem, but is not the answer. It affects water movement in the soil adversely and complicates summer maintenance. The development of dense turf — by fertilization and watering if needed — to form a surface cushion for the ball to rest on, is the best and cheapest way to provide better lies.

Sandy soils present the real problem. Their low water-holding capacity makes it impossible to keep turf during summer heat and drought. Furthermore, they are low in plant food, particularly nitrogen, because plentiful aeration speeds destruction of organic matter. Here again top-dressing is usually advocated. A thin layer of heavier soil does not solve the problem. Fairway watering, together with fertilization to stimulate growth and help curb weeds and clover is more effective. It is less expensive, too. Where irrigation is impossible, the only alternative is to encourage fescue. It stands drought better than any other fairway grass. Little or no water should be used on fescue and it should not be shaved with mowers.

There are a few courses where all or parts of fairways are pure peat to variable depths up to ten feet or more. Uneven settlement occurs at first because the peat is loose and spongy. As decomposition occurs, the peat becomes more compact. After a few years, rapid decomposition stops and surface contours change very little. By that time the original surfaces have become very rough. Mowers scalp the knobs and

fail to cut grass in the depressions. Golf balls invariably stop in the long grass at the bottom of a deep depression. The lies are extremely bad and exasperating to the golfer. Leonard Bloomquist at Superior Golf Club in Minneapolis solved the problem very simply. Creeping bents always predominate on peat fairways, even on the unwatered ones. He cross-diced the rough peat fairways enough times to cut the sod into small pieces. The diced areas were then levelled with a road grader and rolled lightly. The creeping bent stolons in the sod pieces started growth and developed a turf rapidly. The first fairway to receive this treatment was still level twelve years afterwards.

Proper Drainage

Obvious drainage needs are generally provided. But damage from seepage is seldom recognized. Poor turf along slopes or near the base of hillsides is usually caused by seepage. Damage occurs in spring or fall. Kentucky blue grass and fescue disappear, whereas moisture-loving creeping bent grass and poa trivialis survive. Tile lines to intercept seepage must precede fertilization and reseeding. Their direction should cross the line of flow. The other alternative is to use moisture-tolerant creeping bent grasses.

It is a simple matter to confirm or reject seepage as an unfavorable factor. Three or four test holes, four or five feet deep, placed at intervals from top to bottom of the hillside will tell the story. They should be dug with a post hole digger in the fall and lined with small drain tile. Then it is possible to observe and measure the water table during late fall, winter and early spring. Standing water in the tile, up to or near the top is evidence that tile drains are needed to intercept seepage waters.

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When blue grass or fescue winterkill in slight depressions which are almost imperceptible — knotweed, clover, or plantain take possession. Tile drainage is not the answer. Drains never function when ground is frozen. Improved surface drainage, or the use of water-tolerant creeping bent is the obvious solution.

Watering the Fairway

Grass turns brown and fairways become hard under foot during dry weather. Older members complain of fatigue from walking on hard, baked ground, and the younger ones crave green turf all season. Members



Heavy growth of clover on closely mowed, unwatered fairway which is not fertilized.

clamor for water to keep the grass green and to make walking less arduous. They think water is the sole answer to the fairway problem. One fairway, an approach, or a landing area is watered for a season to test and verify their contention. Then the water system is installed.

Fairway watering has been eminently satisfactory on some courses, and a dismal failure on others. Like most new devices, fairway watering has suffered most from its greatest boosters. It will not become accepted practice until the relationship between water, fertilization, and cutting is clearly understood by club officials and members. Unless the club is prepared to carry the additional financial burden of extra cutting, and fertilization besides the cost of water and its application, the club had better forget about fairway watering. The over-all increased expense, including interest on the investment and depreciation of the water system, will be \$3,000 to \$5,000 or more per year for an eighteen hole course.

The cost of water is negligible when there is an ample supply on the property. The outlay for power to operate the pumps

becomes the only expense. But, where water must be purchased, the cost may be considerable. Some clubs spend \$3,000 to \$5,000 annually for water alone. Local restrictions on the use of water for sprinkling in June, July, and August may deprive the club of water when it is needed most.

Irrigation eliminates water as a growth-retarding factor. It increases the demand for plant food by providing optimum moisture at all times. Unless enough fertilizer is applied every year, a marked increase in weeds and clover is sure to follow. In other words, fertilizer is more important than water. If a club cannot afford both, it is more sensible to use fertilizer and build good turf, rather than water copiously and soon have poa annua, clover, knotweed, chickweed, and other weeds only. Many clubs have learned this truth from bitter experience.

Fertilizer requirements vary, depending upon soil type and plant food content, fairway acreage, kind of grass, length of growing season, etc. Most clubs err on the side of too little rather than too much fertilizer. At one eastern club where fairways have exceptional turf despite long time watering, it is routine practice to fertilize three times each year, in April, June, and September. The fertilizer used furnishes 50 pounds elemental nitrogen and 25 pounds phosphoric acid for each application. Obviously, the maintenance budget is not skimped, yet the club spends wisely because there is a full membership with a long waiting list.

After deciding to water, a careful survey should be made to see that fairways contain suitable grasses. If fescue predominates and the soil is heavy, it is sure to disappear within a year or two after watering starts. Even Kentucky blue grass will not survive under heavy watering and persistent close mowing. Then poa annua, clover, and weeds will overrun the fairways, even though fertilization is adequate. Turf will be reasonably good during the cool spring and fall seasons when poa annua is at its best. As it weakens in early summer, clover and knotweed become bad and predominate until temperatures moderate in early fall. Fairways with pure stands of fescue or Kentucky blue grass should be reseeded before watering starts to introduce more desirable grasses. Common practice is to use colonial bent.

Grasses for Northern Courses

In the early days it was customary to use fescue liberally, along with variable a-

(continued on page 94)

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Score Analysis Explains Fractional Par Basis

By WILLIAM B. LANGFORD

The objection advanced by many golfers to the suggestion that fractional par is a more accurate measure of scoring probability and a fairer basis for course rating and handicapping is that a hole cannot be played in a fraction of a stroke. This reaction indicates a misconception of the real meaning of par. Par is the probable average best score on any hole made by experts playing under normal conditions, disregarding the element of luck, and is thus normally fractional.

Whole stroke par must necessarily classify together holes which actually vary almost a stroke in difficulty. For instance, our present whole stroke par rates 255 and 445 yd. holes as equal at par 4; whereas the 255 yd. hole is really a tough 3 and the 440 yarder an easy 5.

This unfair classification has two evil effects:

First; it discourages the construction of many excellent holes because they are easy or hard pars and result in runaway tournament scores and unjust handicaps. Holes on which score is uncertain are obviously splendid fighting grounds, the hardest to make in any given figure and the best on which to award handicap strokes. A hole repeatedly made in the same number of strokes is certainly easy and comparatively uninteresting. To avoid building the finest type of hole because of a faulty standard of measurement is unintelligent and robs the game of vital interest.

Second; by focusing attention on whole stroke par, players become unduly score conscious. As par is rightly a measure of expert play, the fact that a player cannot score many pars on a round does not necessarily mean that par is wrong but just that the player is not an expert. Par is not an easy goal and should only be gained by topnotch performance. In addition, many par scores are the result of lucky, not accurate play, are undeserved and give no real satisfaction.

Week-end golfers and those whose age exceeds 50 could save many moments of

agony and even score better if they concentrated on their shots and derived their real thrills from sound strokes rather than from what the pencil records. Maybe, if fractional par prevailed, more golfers would take up foursome instead of four-ball play and enjoy faster, less strenuous recreation and the pleasure of real partnership competition.

From Bogey to Par

"Bogey" was the first attempt to establish a measure of scoring probability for golf courses by which players could judge the excellence of their games and from which handicaps could be readily calculated. The mythical Col. Bogey toured the links with the old "guttie," playing an even game without mistakes or miracles, good luck or bad. His score was always 3 on holes up to 200 yds., 4 on holes ranging from 200 to 350 yds., 5 on 350 to 500 yd. holes and 6 on "Long Toms."

With the advent of the rubber cored ball, bogey fell out of step and par was adopted in its place. Its distance attainment schedule is 250 yds. for the tee shot, 195 yds. for the second stroke and 155 yds. for the third; setting par at 3 for holes up to 250 yds. length, 4 for holes of between 251 and 445 yds., 5 for 446 to 600 yd. holes, and 6 for those over 600 yds.

Today, improved greenkeeping methods, better implements and sounder playing technique have again lowered the scores of experts and, in fact, of all golfers to such an extent that par, like its predecessor bogey, is also out of step and needs revision badly.

Par an Inaccurate Gauge

Par now in use is an inaccurate gauge for two reasons: First; as it presents a length attainment sequence entirely at variance with contemporary or even past performance; and second, it is too coarse a measure in classifying as equal holes which are nearly a stroke apart.

Consider first the faulty length sequence. Par now sets up 250 yds. as the average limit of experts' well hit tee shots and

195 and 155 yds. as the maxima of first-class second and third shots. While the distance attainment average will drop progressively with an increase in the number of strokes taken, it will not fall off at the rate set by today's par schedule. Two hundred fifty yds. is approximately the top-notchers' average distance expectancy from the tee, but one who can do that well with his driver will certainly average better than 195 and 155 yds. on his second and third strokes. I suggest a progression of 240-225-215-210 yards to replace the series of 250-195-155 now in use.

I have based my proposed progressive fractional par on this sequence and check tests on the scores made in many major competitions prove its accuracy.

On the second defect, remember that par, properly considered, is the average score of first flight players performing flawlessly under normal conditions. A whole stroke par score on any hole, if not a setup, is either easy or hard to get, therefore, to be uniform, par should usually vary fractionally from a whole figure.

A whole stroke par can be set up for competitive purposes, but a fractional par is necessary to rate holes and courses closely and to provide a standard sufficiently accurate for the calculation of handicaps which will be fair on all courses.

No mechanical par table based on length alone can be a final measure of score since many other factors such as turf condition, ground speed, surface warp, hazard locations, etc., make the score vary as much as four-tenths of a stroke per hole from a length-based setup. The effect of these other factors is variable and inseparable, but can be measured collectively by an analysis of the best competitive scores made during a season's play.

Length is by far the greatest cause of score variation and the only factor lending itself to mechanical treatment. A length-based fractional par can be predetermined mathematically and, when modified by an adjustment indicated by careful score analysis, become a close measure of playing ability and hole value.

An assumption that 240 yds. is the experts' average expectancy from the tee and 300 yds. his maximum average hope will set up 240 yds. as the longest positive 3 par hole and 300 yards as the shortest positive 4 par hole. Hence, the mean distance, 270 yards, is a logical length to adopt for par 3.5 in a fractional arrangement.

Similarly, referring to the proposed progressive sequence of 240-225-215-210, 465 yards — the sum of 240 and 225, the experts' average best first and second shots — is the length of the shortest positive 5 par hole and 382.5 yards, the mean between 300 and 465, the logical par 4 distance.

As 60 yards is the allowance for extra distance on average 240 yard shots so, by the following ratios: 240 is to 60 as 225 is to 56.25 as 215 is to 53.75 and as 210 is to 52.50, it thus is determined that 56.25 yards should be the commensurate allowance for extra distance on the second shot, and 53.75 and 52.50 yards proportionate average for the third and fourth strokes, and the same reasoning which established par 3.5 and par 4 distances will develop this table of control lengths for the fabrication of a fractional par schedule:

LENGTH PROGRESSION

Number of Strokes	1	2	3	4
Shot Length	240	225	215	210
Total Distance Progression	240 — 465 — 680 —			

EXTRA LENGTH PROGRESSION

	65	60	56.25	53.75	52.5	
Average	32.5	yards	:			2.5 Par
O plus 65	:	65	yards	:		Min. 3 Par
Average	152.50	yards	:			3 Par
1st Total Distance:	240	"	:			Max. 3 Par
Average	270	"	:			3.5 Par
240 plus 60	:	300	"	:		Min. 4 Par
Average	382.5	"	:			4 Par
2nd Total Distance:	465	"	:			Max. 4 Par
Average	493.125	"	:			4.5 Par
465 plus 56.25	:	521.25	"	:		Min. 5 Par
Average	600.625	"	:			5 Par
3rd Total Distance:	680	"	:			Max. 5 Par

By interpolation between the control distances thus established we obtain the following Progressive Fractional Par:

CONDENSED TABLE

PAR	DISTANCE	PAR	DISTANCE
2.50	30 to 38 yds.	3.90	355 " 365 "
2.55	39 " 50 "	3.95	366 " 376 "
2.60	51 " 62 "	4.00	377 " 388 "
2.65	63 " 74 "	4.05	389 " 399 "
2.70	75 " 86 "	4.10	400 " 410 "
2.75	87 " 98 "	4.15	411 " 421 "
2.80	99 " 110 "	4.20	422 " 432 "
2.85	111 " 122 "	4.25	433 " 443 "
2.90	123 " 134 "	4.30	444 " 454 "
2.95	135 " 146 "	4.35	455 " 465 "
3.00	147 " 158 "	4.40	466 " 476 "
3.05	159 " 170 "	4.45	477 " 487 "
3.10	171 " 181 "	4.50	488 " 498 "
3.15	182 " 193 "	4.55	499 " 509 "
3.20	194 " 205 "	4.60	510 " 519 "
3.25	206 " 217 "	4.65	520 " 530 "
3.30	218 " 228 "	4.70	531 " 541 "
3.35	229 " 240 "	4.75	542 " 552 "
3.40	241 " 252 "	4.80	552 " 562 "
3.45	253 " 263 "	4.85	563 " 573 "
3.50	264 " 275 "	4.90	574 " 584 "
3.55	276 " 286 "	4.95	585 " 595 "
3.60	287 " 298 "	5.00	596 " 605 "
3.65	299 " 309 "	5.05	606 " 616 "
3.70	310 " 320 "	5.10	617 " 627 "
3.75	321 " 331 "	5.15	628 " 637 "
3.80	332 " 343 "	5.20	638 " 648 "
3.85	344 " 354 "	5.25	649 " 659 "

WHOLE STROKE PAR

Par 3 — to 244 yds.
 Par 4 245 " 469 "
 Par 5 470 " 684 "

Fractional Par Comes Close

To check the mathematical theory of the fractional par determination which I have here presented I checked with actual performances in the 1936 National Open at Baltusrol, the 1937 National Open at Oakland Hills, the 1939 National Open at Philadelphia CC, the 1934 \$5000 Open at Louisville (Ky.) CC and a qualifying round at the 1936 Public Links tournament at Bethpage.

It will be noticed that in the table on play at the Philadelphia CC, on nine of the holes the low 202 players in the 1939 National Open had an average score under fractional par and on the other nine were above fractional par, but that the difference between actual performance and fractional par for the entire course was only 5 per cent.

There is a possibility that the difference was smaller or greater, due to shifting of the tee markers and cups. In this connection, let me suggest that markers be permanently set beneath the range of mower blades at the spots on tees from which scorecard distances to the centers of greens are measured.

The tables:

1939 U.S.G.A. OPEN CHAMPIONSHIP — PHILADELPHIA C.C.

AVERAGE SCORE (LOW 202 PLAYERS)

HOLE	LENGTH	FRAC. PAR	NET	GROSS	NET DIFF.
11	169	3.07	3.04	3.09	-.03
7	191	3.16	3.05	3.10	-.11
13	206	3.23	3.29	3.34	+.06
2	234	3.35	3.31	3.36	-.04
16	328	3.76	3.83	3.88	+.07
9	350	3.86	4.02	4.08	+.16
17	363	3.91	3.93	3.98	+.02
3	384	4.01	4.07	4.12	+.06
14	394	4.05	4.09	4.14	+.04
15	421	4.17	4.04	4.09	-.13
5	425	4.19	4.20	4.25	+.01
6	447	4.29	4.21	4.26	-.08
1	450	4.31	4.26	4.31	-.05
4	453	4.32	4.20	4.25	-.12
10	454	4.32	4.29	4.34	-.03
8	479	4.44	4.43	4.48	-.01
12	480	4.44	4.53	4.58	+.09
18	558	4.80	4.92	4.98	+.12
		71.68	71.71	72.63	0.05

(Turn to page 114 for table showing variation of net scores from fractional par on varying length classes of holes in five major competitions.)

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Wilson Sporting Goods Co. has a new 16 mm. black and white sound film, "Golf Doctor" covering high spots in career of Dr. Cary Middlecoff who laid away his dentistry tools and has been filling cavities in golf greens with Wilson golf balls to good profit. It's a very entertaining instruction film. Details of rental on request from nearest Wilson office.

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Establishing Par in Pro Business for 1949

BY REX McMORRIS

Pros who play against the scoreboard can adopt the same idea with success in conducting their business operations at the club, according to numerous professionals who have given the business par idea a test.

Business generally now works on the budget system of estimating sales and setting operating costs in advance and the usual system of budgeting at golf clubs keeps course and house operations well in line, signaling the need of adjustments before the season is on its way out and it's too late to make effective corrections. But seldom does the pro apply this operating policy to his own department. However, those who do check a list of their members and their present golf playing equipment against possible sales for the season have found that the practice is not only a guide to buying but points out some weak spots in operation.

With down-town competition getting back into the pro business picture this year the pro is going to have to watch all opportunities for sales. How many times a pro sees a member show up with a new set of clubs he bought away from the pro shop and has been shocked by losing the business when an examination of the player's equipment in bag storage would have reminded the pro and his assistants to stay close to that member and tactfully keep a bit of selling steam on him!

Records Pay Off

Not only the pro, but every other small retailer is inclined to make the mistake of depending too much on general impressions instead of records in governing business operations. The larger companies spend fortunes in market surveys to determine sales possibilities and they make this expenditure pay profits. The pro can apply the same idea very easily. In applying the idea he can give his assistants a good clear view of the members' needs and how to sell them.

A few nights going over the contents of each bag, studying them and listing them on file cards probably will give pro shop staffs a picture of their market that they never had before. The procedure also is

sure to give much more specific data on pro shop stock requirements than most pros have as a result of depending entirely on previous years experience.

No "Saturated" Market in Golf

You hear around that fairly large post-war business in club sales is going to make it tough for some of the boys to have satisfying volume this year. A look at the bags in storage will correct that misconception. Even a casual survey of clubs in storage at representative shops of different types of private courses and of equipment brought to the first tee at daily fee and public courses shows that at least half the clubs and bags are about due for replacement. One especially impressive thing about such surveys is that the older golfers who have the most money to spend usually have the worst equipment. Many of the older men are badly handicapped by clubs that they bought years ago and which don't fit their physiques or swinging habits at all today.

Women's Kids' Markets Grow

Almost every survey of clubs in storage at pro shops will show that women's club sales, although good last year, are far short of what they should be considering the need of the women players and the increasing play of women golfers. One point that several pros have brought out is that what women used to spend for caddies before the war and now don't spend because of their use of golf carts, is a goodly sum that should be spent for clubs.

But just how big this women's market is and who are the women constituting this market isn't often recognized until a survey of the bags is made.

The youngsters who have been getting pro class lessons for years and who have been exposed to golf in high schools and colleges now are getting old enough to have good equipment that they won't out-grow for years. Some numbers in manufacturers' lines are being discontinued and provide good clubs at bargain prices. There is a great field for the pro to work. He can use the time payment plan with excellent