

THE WORLD'S
CHAMPION
GOLFERS

THEIR ART DISCLOSED BY
THE ULTRA-RAPID CAMERA

WALTER HAGEN

U.S.A.

OPEN CHAMPION OF AMERICA, 1914 AND 1919
BRITISH OPEN CHAMPION, 1922 AND 1924

THE DRIVE. 36 Positions

(No. 1. FIRST SERIES)

BY

GEORGE W. BELDAM

AUTHOR OF "GREAT GOLFERS—
THEIR METHODS AT A GLANCE" &c

PRICE TWO SHILLINGS

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THE WORLD'S CHAMPION GOLFERS

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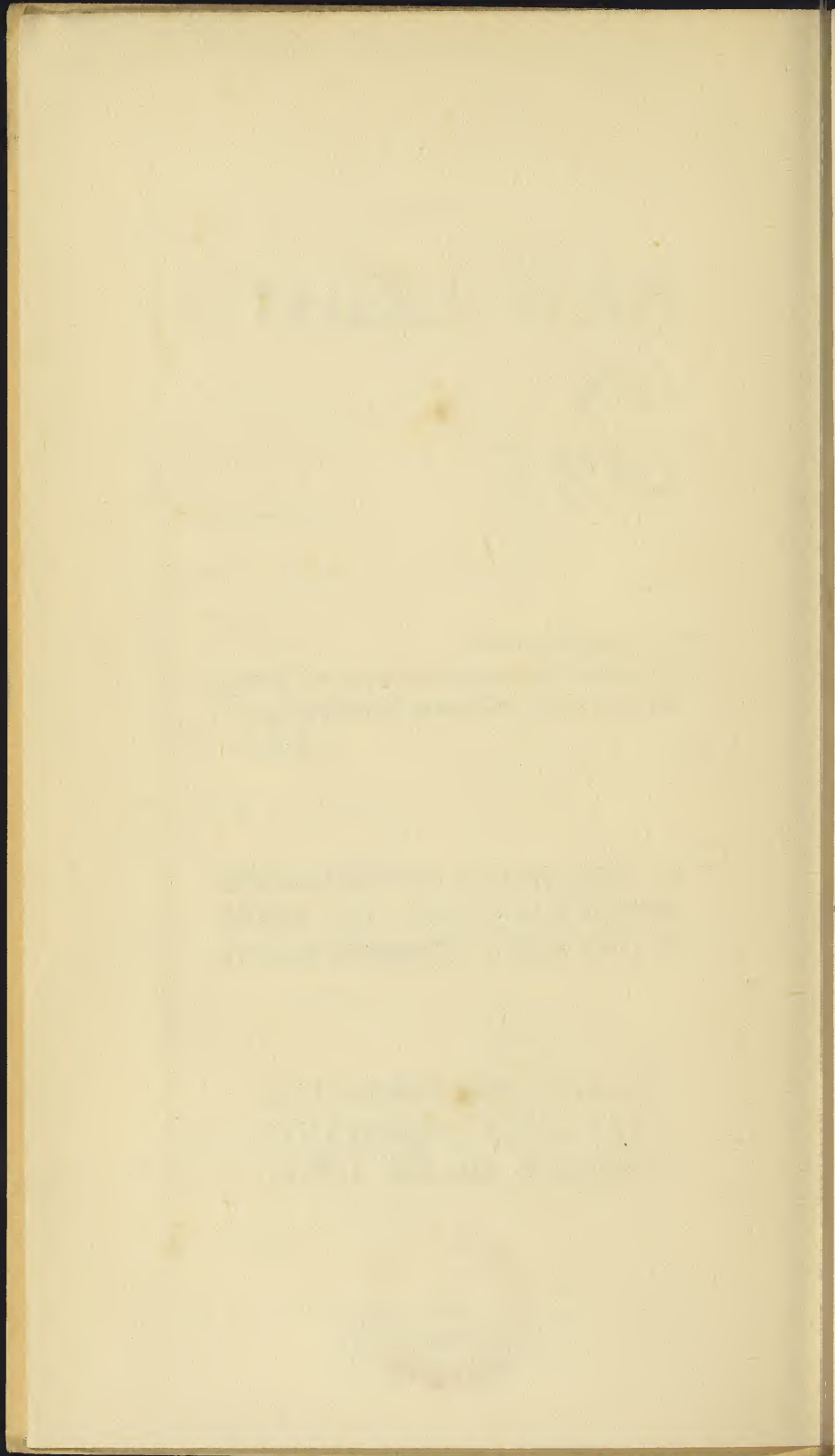
NEW LIGHT ON GOLF

*"O! I wad like to ken
The reason o' the cause an' the wherefore o' the why
Wi' mony anither riddle brings the tear into my e'e"*
R. L. S.

IN THESE PHOTOS THE ULTRA-RAPID
CAMERA HAS SOLVED THE RIDDLE
OF GOLF AS THE CHAMPIONS PLAY IT

36 PICTURES REVEALING
THE GOLF SECRETS OF
WALTER HAGEN, U.S.A.





THE DISCLOSURE OF THE ART *of the* WORLD'S CHAMPION GOLFERS

By means of . . .
THE ULTRA - RAPID CAMERA

PREFACE

I HAVE been silent for many years as to the theory and practice of golf.

When my first action photographs appeared in "Great Golfers—Their Methods at a Glance" some twenty years ago, I warned others against making deductions from them without having the key to their interpretation.

Yet, as they opened up an entirely new line of thought on the game, and as they showed the players what they actually did for the first time in the history of the game, many writers set out to deduce theories from them minus the key to their interpretation—and I fear I also fell into the pit against which I had warned others.

I never gave up hope of eventually finding a key which would be the open sesame to the action photos, whether the player be a champion or otherwise.

It is because I believe the key has been found which gives the knowledge necessary to their interpretation, that I once more attempt to instruct others. To put into language what one means to convey, without photographs from which to demonstrate, would be to court disaster and confuse many.

I shall, therefore, as much as possible, rely on the demonstration of the movements as seen in the series of photographs to make the arguments clear.

As far back as 1907 some of the champions were good enough to hit twenty balls for me, so that I could time them at different parts of their swing, and piece together what a friend called a cinematographoid. It speaks volumes for their accuracy, for these cinematographoids might easily be mistaken for a series chosen from those made by the Ultra-Rapid Camera of one drive.

This camera was designed by Mr. Cox, of the Cinechrome Instruments, Ltd., to show the Admiralty the cause of the accidents which occurred to aeroplanes on returning to the deck of the mother ship.

The camera is worked by a motor, and 250 pictures pass the lens in one second. Enlargements from a choice of these give much finer detail than those enlarged from the ordinary cinema camera, in which only sixteen pictures pass the lens in a second. Those who have seen the slow-moving pictures on the screen must often have felt the desire to see them over again, possibly just to observe one point in the swing which struck them most, and it is because I felt the same desire that it occurred to me to stop the slow-moving pictures at every essential point in the swing—once and for all—and these series of enlargements are the result.

My thanks are due to Mr. Woods-Taylor, who operated the camera on behalf of his firm, and, without knowledge of the game, quickly assimilated what was required.

Also, my thanks are especially due to Thos. Carruthers, M.D., who possibly in his next incarnation—if not in this—will give us the most scientific treatise on golf which this world is likely to see. The research work done with his collaboration has greatly helped to the interpretation of action photos and slow-moving pictures, and, without this acknowledgment, I should not feel myself at liberty to produce these booklets. This preface would indeed be incomplete without acknowledging the courtesy of those who were good enough to play shots for me before the camera. What surprised me most was their concentration—the bir, bir of the motor seemed to be hardly noticed by them. When I mentioned this to a friend, he replied: "But they've played before silent crowds!"

When the champion with the many waggles appeared I warned the operator, for every second meant 30s. worth of film, and his waggles I could foresee might easily cost a ten pound note! Somehow, his film was fogged, and the reason was never discovered. Lastly, my one aim is to help golfers of all ages and handicaps to become natural golfers—if they are not so already—and cause the chains of mechanical teaching to fall from their shoulders—and hands—so that they may forget the hundred-and-one details they have been taught to think of while making a swing. I fear many, including myself, have unwittingly misled others by deductions from action photos. Yet how easily they can be interpreted from "without to within," instead of from "within to without"; the hub moves the rim and not vice versa. From "within to without" means the club head is the last to be moved. I must leave

the chapter on "Flail" to make this clearer, though in these booklets I fear only the groundwork can be broken, but the Key Book explains in greater detail.

I was urged, whatever message I may have for the golfing world, to give it in book form—one large book—but, after carefully considering this matter, I came to the conclusion that for comparison of the series of photographs the Key Book should be a separate entity, so that reference to the letterpress and the series of photographs would be facilitated; for nothing is more annoying than to have to continually turn over to seek for any points of reference while analysing the photos.

Above all, I sincerely hope all teachers will try and grasp what is the teaching of the Ultra-Rapid Camera pictures. They give actual facts—not what the player thinks he does, but what he really does.

The message is : find out the principle common to all the champions, learn to read their movements as the photos show them in detail and as a whole, then apply the principle while taking into account the pupil's individuality or idiosyncrasy.

I am content to stand or fall by what I have attempted to show in these little booklets and the Key Book, because it is all there, in the analysis of the pictures by the Ultra-Rapid Camera, for those who have eyes to see.

The aim is to show how the world's champions arrive at the movement which leads the onlooker to feel that the maximum of effect has been achieved with the minimum of effort. That is a good measuring gauge for one's efforts during practice.

"Let the weight of the club head do it," is an old saying of the professionals. Yes; but how? I have tried in these booklets to give the answer; if they meet with any measure of success, then it is by no means the end, but just the beginning of new vistas for those who are led to cease from applying force and effort in the wrong way, and by understanding that the art consists in a uniform increase of the speed of the club head. The principle common to all the world's champions lies in the fact that the motive power comes from within and is transmitted outwards to the club—the "wrists" are the medium through which this power acts, but they do not supply the motive power.

G. W. B.

*Boston Lodge,
Ealing.*
1924.

THE KEY TO THE INTERPRETATION OF THE
SLOW-MOVING PICTURES IS "FLAIL"

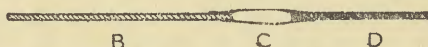


THE FLAIL

THE Flail is an instrument which was generally used for beating out the ears of corn before more up-to-date methods came into use.

It consisted of two sticks, one longer than the other, which were joined together by leather thongs—here is an illustration :

DIAGRAM ONE



B was called the hand-staff, and will be referred to as the staff.

C is the thongs, and D the swiple, which was loaded at the end, similar to a golf club, which has lead in the back of the head.

The function of B was to move D by means of C in such a manner that D was flailed on to the ears of corn.

It is obvious that the staff had to stretch the thongs before the swiple could be moved—that is, any slack had to be taken up first, when the swiple would at once answer to any movement conducted to it by the staff operating on the thongs. If the staff pulled, the thongs would pull the swiple. If the staff turned round a moving or fixed axis, the swiple would do the same via the thongs—the wrists of the Flail. The movement was similar to that seen when three or four navvies are wielding sledge hammers on to one chisel in breaking up the road.

There were various methods of using the Flail, all, however, whether big or small movements, had to take into account the thongs.

CHAPTER ON FLAIL

IN WHICH ONLY THE GROUNDWORK IS BROKEN, AS
FULLER INFORMATION ON THE SUBJECT
IS GIVEN IN THE KEY BOOK



As space is limited in a booklet it is better to go straight to the point.

Firstly.—It is necessary to make plain what a Flail is, for there are many who have never heard even the name.

Secondly.—It is important to show how "FLAIL" is adapted to the human machinery.

Thirdly.—It is essential to show by demonstration of the photos that the champion golfer's movements can be interpreted by the application of "FLAIL."

But it was the discovery that Flail is the key to the interpretation of all natural movements—in which the maximum of effect is achieved with the minimum of effort—that led to the use of the very special Ultra-Rapid Camera, in the hope that it would prove beyond doubt that Golf was no exception.

The reader shall judge for himself whether the art of the champion golfers is not disclosed.

The movements governing "FLAIL" are diametrically opposed to most of the teaching on the golfing swing of the past twenty years.

That teaching, so far as the timing or order of the movement was concerned, was :—The hands take the club back (with turn or otherwise), and call on the arms, which call on the shoulders, which call on the hips.

The "FLAIL" movement will be seen to be just the reverse of this. Again, teaching has put the mind on "wrists," with the result that in many players they have become active, viz., supplying the motive power. In "FLAIL" it is the reverse of this, the wrists supply none of the motive power, and that is why they have been made the thongs, as applied to the human machinery. They are simply the medium by which the muscular effort originating in the pedestal is translated into speed of the club head.

There is often confusion where the terms "wrists" and "wrist" are used. The former means the forearm and wrist joint—for the wrist joint can only of itself bend four ways, and only the humerus or radius can cause it to turn. The latter, viz., "wrist" is the generic term, as applied to wrist-work, the function of the wrists.

For further analogy the "wrists" may be looked upon as a reduction coil—they are but the medium through which the power passes, but do not supply it.

In "FLAIL" the timing or order of the movement is inherent, and because the movement is from "within to without," from the hub to the periphery, from the feet to the club head, almost any degree of motive power can be applied without fear of overbalancing, or upsetting the timing or order of the movement. That is why the champions and others can "press" without fear if they want to.

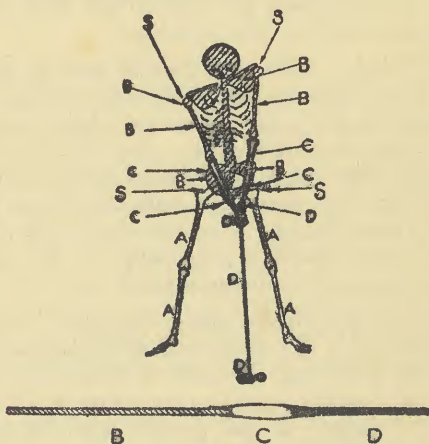
When the hands or wrists supply the motive power, and move the rim first, overbalancing at the hub must result. It is force misapplied which breaks clubs, and whoever heard of the rim starting to move the hub of a wheel?

Enough has been said to prepare the way, and perchance the reader's mind, for the assimilation of the various movements, as shown in the champion golfers' series, and the explanation. An illustration of a "Flail" is given. The following diagram shows how the "FLAIL" in principle is adapted to the human machine for the purposes of playing golf. The "wrists" have purposely been made the Thongs, so that it is evident they cannot supply any motive power.



A Diagram showing how "Flail" in principle is adapted to the Human Machine

DIAGRAM TWO (DRIVE)



A—*White part*—Feet and legs—The PEDESTAL.

The feet grip the ground, even inside the shoes.

The ankles and knees bend, and the legs are joined to the hips by ball and socket joints.

The Pedestal supplies lateral and up and down movement and rotation of the legs.

In A lies the motive power to move B.

The muscular effort generated causes a grip of the ground, felt on the inside of the feet and calves, up to the muscles above the knees, not only generating power to move B, but ensuring the firm stance so essential. This is in degrees for all shots, but infinitesimal for the putt and shorter shots.

B—*The shaded part*—made up of the hips, the spine, the shoulders and upper arms—The STAFF.

The Staff moves the Thongs (C).

The hips turn round with the legs of the Pedestal, revolving on their socket joints, they can, at the same time, be moved laterally, or caused to move up and down by the Pedestal. The character of the swing depends on the ratio of these respective movements to each other, but there should always be turn in greater or less degree. Any movement of the hips is conducted to the spine, the shoulders and upper arms. Irrespective of shoulder turn, or lateral, or up and down movement, the upper arms can both (or either) supply an additional movement, viz., rotation within the ball and socket joints, on their own. This causes the "radius" to turn, popularly known as "turn of the wrist."

This movement of B, whatever its character, is conducted to the Thongs (C).

C—*Outlined part*—Forearms and wrist-joints.

"Wrists" or The THONGS.

These are but the medium by which the movement supplied by B is conducted to the hands and club head (D).

The upper arm's rotation (both or either) has a distinct influence on them, irrespective of any turn, or up and down, or lateral movement of the hips.

It is this "arm rotation" which causes twist of the Thongs, or "turn of the wrists." If the Thongs are pulled on by B they are tautened, but they are twisted by upper arm rotation. Both movements influence "wrist work."

D—*The black part*—The hands, fingers and club—The SWIPLE. Whatever movement is given to C by A and B is conducted naturally to the SWIPLE.

The hands should be part of the club and move as the club moves, and turn as the club turns. If this is granted, the grip, whether overlapping, interlocking, or the old-fashioned (which takes a lot of beating when they are not allowed to supply the motive power) matters very little, since the hands do not supply the motive power, but conform to other movements conducted to them and the club.

The fingers simply guide and control all movement.

In all the champions, *in degrees*, will be seen a kind of "bracing up," which, while drawing towards a centre the scattered forces, also causes the thongs to be "set," so that the power, acting on the staff, will immediately conduct any movement to the club head. In some, the bracing up tautens or "sets" the thongs by vertical movement (the upward lift) emanating from the region of the feet to the knees, and causing a grip of the inside of the feet on the ground because of a centralising of the muscular effort, and tension is felt in the muscles above the knees. This lift would pull the club up and away from the ball, but the upper arms resist and press downwards and are drawn closer to the sides. (See R. H. Wethered series.) So the thongs are straightened also. A feeling of power is thus generated and ready to be let off via the staff.

The other method is that as seen in George Duncan's series; his generation of power is not so obvious, but all the movements described as above are there in degree, but he relies on lateral movement of the hips via the legs of the pedestal to start his movement, which throws his thongs via staff forward slightly (the hands are the symptom); the reflex action back causes the thongs to stretch by the staff pulling on them, so that his hands are seen well behind the ball before the club head is moved; the staff is preparing to "flail" the club head back and round. This is the commencement of his movement and part of his swing.

In the drive, the twist of the thongs, or turn of the wrists, seems to take place with most at about the horizontal position on the way up, as they untwist naturally at the same position on the way down. This is analysis, and, in a certain way, it is wrists from start to finish—if by wrists is visualised thongs—and, therefore, it follows that the shorter the shot the sooner the thongs are seen to twist (analysis). The whole movement is adjusted to the length and kind of shot. The thongs can be "thrown" back, or "slung" round in any and every direction, and in any plane, causing the swiple (hands and club) to follow with turn and bend in varying degrees.

The timing or order of the movement is explained in the demonstration of this series of photographs, but all seem to come down, giving the feeling of "all of a piece" movement.

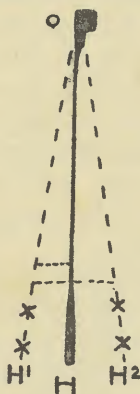
The idiosyncrasies of the players are easily seen by comparing any of the series of the World's Champion Golfers.

When once "FLAIL" is understood, the player will find he has no longer any occasion to think how he will take the club back, and the hundred-and-one details will sink into oblivion, and he will be well on the way to become a natural golfer.

"FLAIL" really means that the movement is from within to without—from the feet to the club head.

To understand the initial movement, visualise the club head as lightly glued to the ground until the movement from B releases it by means of the movement of C.

DIAGRAM THREE



Initial movements of "FLAIL" and Club XX. The hands are caused to move from H to H1 and back to H2 (G. Duncan's example), or they may only be moved from H to H2 without the club head moving away from the ball; in this method the thongs are stretched and the swing commenced.

If he sees the slow-moving pictures, he must remember that 250 of the pictures passed the lens in one second, whereas the speed of the ordinary cinema camera, which gives the movement more as the eye sees it, means only 16 pictures passing in a second. Therefore, multiply the slow-moving pictures by at least 12 to get the speed as the eye sees it; otherwise there may be created a race of slow-moving golfers, whose rhythm of movement will be but a spurious imitation of the pictures. The Key Book is left to deal with these and other points more fully, including the Golfing Swing.

WALTER HAGEN, U.S.A.

(Born 1892)

OPEN CHAMPION OF AMERICA, 1914 AND 1919
BRITISH OPEN CHAMPION, 1922 AND 1924



THE DRIVE

THIS series of photos was taken at Sandwich in 1922, the day before the championship proper was played, which Walter Hagen won by one stroke, after a dramatic finish, in which George Duncan just failed to equalise.

In 1923 Hagen was beaten by Havers by one stroke, but in 1924 he again won at Hoylake by one stroke.

Such a record speaks for itself and stamps Walter Hagen as one of the finest golfers and fighters of all the world's champions.

In 1922, when this series was taken, the writer was asked in the evening whom he thought would win the championship, and he said he saw no one to beat Hagen, if he played as he did before the camera that day.

Naturally, the writer had to give his reasons. They were :—(1) That he had seen no one with so free a movement and yet so balanced, so far as the Drive and Iron Shots were concerned, and also that the player never looked like missing a putt, and holed both the six-yarder and six-footer before the camera on the last green, and that before the "bir-bir" of the electric motor. But not even the Ultra-Rapid Camera can discover the secret of a man's fighting capacity or temperament, but the last three championships, so far as medal play is concerned, have shown that Hagen stands easily first in that respect amongst the world's champions. The key to his temperament lies with his famous remark to a friend, who said : "That's not one of your best, Walter !" "No," was the answer, "but that's where she lies."

Let us see whether his series of the Drive conform to the general principle laid down, viz., movement from the feet to the club head—"movement from within to without"—the movements which govern the principles of "Flail."

From Nos. 1 to 4 we see him coming up to the ball from rather behind it, waggling slightly the club as he takes up his position relative to the ball (the club is never still), he plants his left foot into position and moves back his right in No. 5, weighing the club head.

The grip is overlapping, the little finger of the right hand overriding the forefinger of the left hand, and the right hand is well under with the left wrist bent inwards.

Nos. 5 and 6 show the waggle, with the hands kept opposite the ball—rotation round a fixed point. The slow-moving pictures show distinct movement of the right knee accompanying the waggle, which is free and virile, and there is no doubt about Hagen's waggle being in sympathy with the pedestal (A).

In many players it is difficult to determine whether there is any movement of the pedestal or not during the waggle, but there is no doubt about it in this player's series.

In No. 7 the club is being placed behind the ball, after the waggle and just preliminary to the "bracing up" movement.

But before proceeding farther with analysis, it does appear that the waggle in its fullness, as seen in No. 6, is reproduced later in the swing from about No. 14. None of the champions start off as they waggle.

In Nos. 8 and 9 the "bracing up" is seen, a kind of shrug, of drawing together or centralising the forces, with a tautening up, but not a straightening of the arms, a bending inwards of the right knee, a slight turning on one side of the head, a gripping of the ground from the inside of the feet,

and the club is started on its backward movement. (See "Bracing Up" in the Key Book.)

All are the same, but differ in their peculiarities.

Hagen's initial movement reminds the writer of the Duncan series, without Duncan's forward movement of the hands rather past the ball, but tautening up rather more in evidence.

No. 10 shows the beginning of the backward movement, the right knee commencing to recede and the left to come round the pedestal (A), moving the staff (B), which moves the thongs (C) (kept in the same relative position as in the final "setting" or "bracing up," No. 9).

So the movement proceeds, with the left arm gradually straightening till the left thong is in line with the upper arm (No. 15), straight left arm, but by no means straight to commence with, yet which will be seen to bend once more towards the finish of the swing.

From Nos. 14 to 17 is seen large displacement of the club head compared with the hands, the club has been displaced through nearly a right angle by turning and bending from the wrist-joint ends of the thongs. No. 17 shows the elbow bend, that is, the left thong bends from the elbow to complete the swing.

Notice the slight turn of the hips required to that of the shoulders, with no pivoting on the toes, left heel on the ground till the club head is past the horizontal position, when there is seen more bending of the left knee and ankle, and not a turning on the left toe. The longer the shot the later the left knee is seen to bend.

This point is worth noticing in all the champions. But the flexing of the left leg facilitates rotation of the hips at the ball and socket joint. It is also most noticeable that there is slight lateral movement of the pedestal (A) towards the player's right, but this lateral movement back is counteracted later in the swing by a gradual movement in the opposite direction, which is easily noticed

by comparing the position of the right leg. So while rotation of the hips is proceeding there is also lateral movement of the pedestal, first away from the line of direction and then towards it. Possibly this might be described as slight scientific swaying. The finish of rotation of B, with slight lateral movement of the pedestal (A) (note the inclination of the right leg in No. 19) has caused the weight distribution to move nearer the left leg.

Anyway, in No. 19 the player is at the top of his swing and about to pull down from the pedestal to start the downward movement, and this pull down is evident by comparing Nos. 19 and 20.

So the *downward movement* is started, and No. 20 shows that the pull down from the pedestal has undone the rotation from the hips, but left the shoulders decidedly behind, yet they have been pulled on also, and in turn they will pull on the thongs (C) to "Flail" the swiple (D) on to the ball.

From No. 20 onwards it is most evident that the direction of the pull downwards from the pedestal has gradually moved the pedestal forward, while rotation of the hips and shoulders is proceeding and the centre of gravity is being gradually shifted till it appears to be almost past the ball. But from No. 25 the left leg commences to straighten and the right leg to "flex" at the knee, till at impact (No. 29) the left leg is practically straight, and rotation has caused the hips and shoulders to be in a position half facing the line of direction and not square on to it as impact is made.

This is the same with nearly all the world's champions. So we see that in No. 20 the pedestal has called on the hips to return, they in turn call on the shoulders and upper arms, which in turn call on the thongs to "Flail" the hands and club (swiple) on to the ball.

But only the Ultra-Rapid Camera shows this, for in actual practice all these movements are

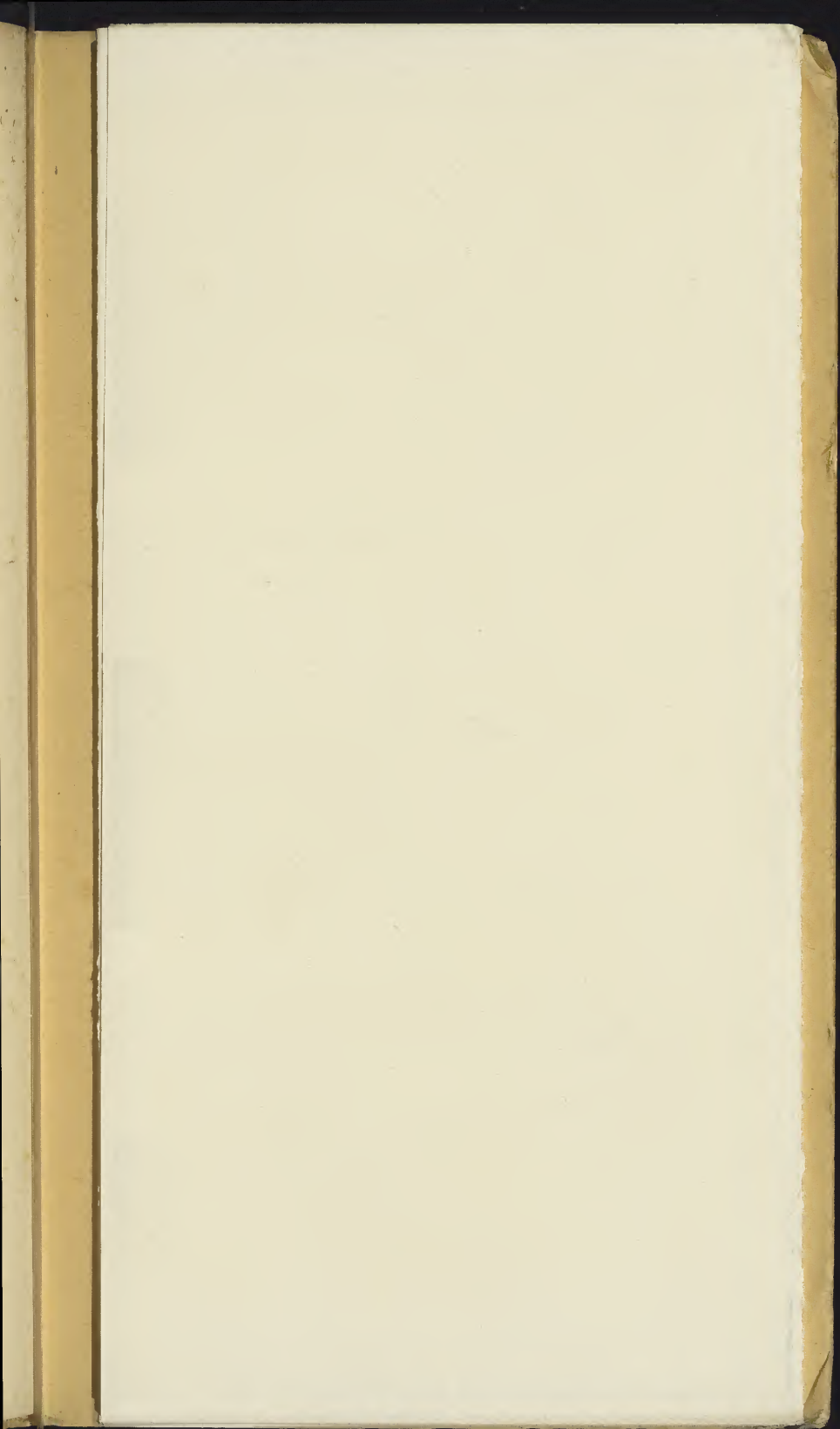
synchronised. The point is that the pull downwards in the direction desired from the pedestal causes rotation to become undone naturally, while the pedestal is also moving slightly laterally.

A most noticeable feature of this series is the position of the head of the player. In No. 9 it assumes an inclination towards the right shoulder, and so it is kept throughout, but not immovable, because it moves slightly up and decidedly down with the pedestal movement (compare Nos. 19 and 20), but without altering the inclination.

Yet it is difficult to believe that the player is looking at the ball at all from the inclination of his head, but rather at a spot a good deal behind the ball. Possibly the Ultra-Rapid Camera has discovered a valuable point; the writer cannot say, never having had the opportunity of asking the player.

The swing after impact is but the momentum of the club head calling on the arms to fly out till the right thong is at fullest stretch, when twist of the thongs occurs, and the thongs pull on the shoulders, which pull on the hips, which move, last of all, into the pictures, finishing the swing, a reversal of the upward and downward movements, so far as timing or order of movement is concerned.

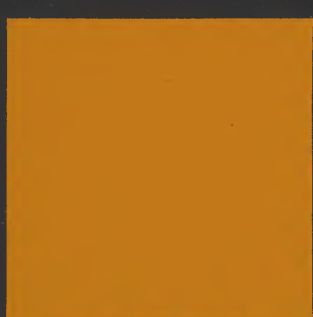
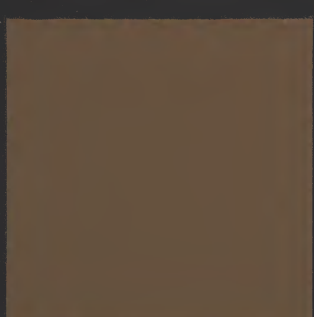
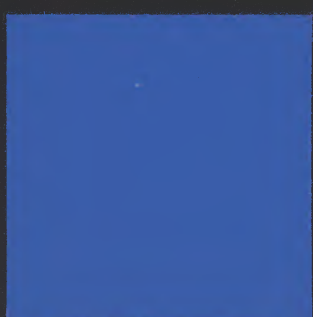
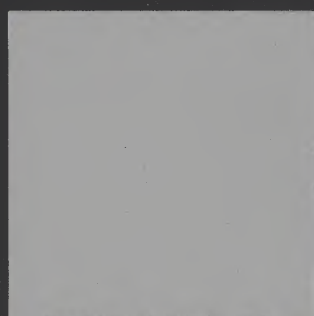
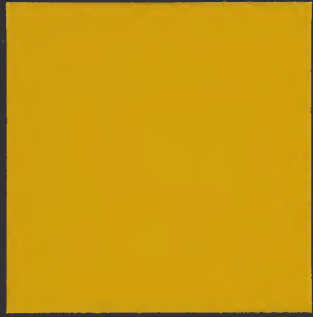
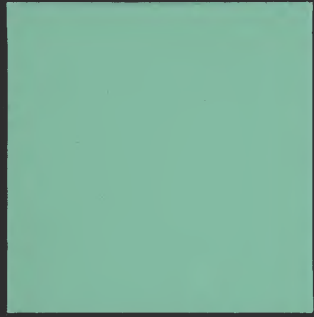
The follow through is so full that the right toe is dragged a little way along the ground, while a turning takes place on the heel of the left leg of the pedestal completing rotation. There is diversity of opinion as to whether such full free movement, which nearly all Americans have, is of any value. Allowing the momentum of the club to act freely, without clipping the follow through, may help considerably towards straightness, but only so far as this idea influences the downward swing. For, at impact, all has happened that can happen—if the stroke has been played properly—and “the wrists” are not supplying motive power to force the club through.





WALTER HAGEN. THE DRIVE (36 POSITIONS)

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