

AN ANALYSIS OF THE HOW'S AND WHY'S
OF OFFENSIVE BASEBALL

by 622

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INTRODUCTION

Even today, it appears that experts in the field of baseball are in disagreement on theories of offensive baseball. In particular they disagree on what makes a player a good or bad hitter. Attempts to analyze the various aspects of sports skills are numerous, some of which need to be expanded upon rather than disregarded, and others more closely examined for any inherent value. Also, quite prevalent in many teachings or coaching situations, is the adherence to traditional and sometimes antiquated methods of teaching a sport skill. This statement is not intended to imply that many coaches are uninformed or utilizing faulty teaching methods. The point to be emphasized is that in recent years, experience and research have made many contributions to sports by the offering of new teaching possibilities that no coach or player can afford to disregard. A coach not only needs to teach the How of offensive baseball, but up and coming baseball talent needs to know Why he is performing the skills. The need is great, as evidenced by controversies over offensive baseball theories, for more established guides or teaching principles developed through a scientific understanding of the various offensive skills. The result of such findings, can formulate certain philosophies or theories which may then be incorporated into teaching techniques and methods which should help any baseball program.

PURPOSE OF THE STUDY

The purpose of this investigation was to analyze the various How's and Why's of offensive baseball in order to possibly ascertain or derive from the study some implications toward the establishment of a more scientific approach to the development of principles in offensive baseball. The study may not only

help others who read it, but it will also provide one a greater understanding for the game, something which coaches and players are always trying to improve.

METHOD OF STUDY

The emphasis of this paper is in analyzing the How's and Why's of offensive baseball, utilizing information from various related fields or schools of thought. One such source was from textbooks written by famous baseball men, and many of the authors ideas and empirical evaluations were somewhat the same and credit was given to all authors quoted or not quoted directly in the study. Also used in the study were articles from the Research Quarterly, Theses, and as mentioned before articles by coaches and teachers, who over years of experience have conducted some limited studies and have developed certain workable and valid theories regarding the offensive mechanisms of baseball.

RESULTS AND FINDINGS

It would appear that no one offensive baseball theory or theories can be truly developed, but the implications from this analysis should make great strides in that direction. More important to note is a need for more research in this area, which in the writer's opinion hasn't been tapped or explored to the fullest. In the final evaluation, a proper execution of the various movements or mechanics examined here should fulfill the main objective of the swing and will do so with grace and efficiency.

BASE RUNNING

The fastest player is not necessarily the best base runner. In many situations speed is the sole factor, but in the majority of cases judgment in relation to speed determines the value of a base runner.¹

The first rule for good base runners is, touch or tag every base; never miss a base. Every player should know thoroughly the rules which pertain to base runners.

The average baseball player finds it difficult to steal a base or advance an extra base on a hit to the outfield. Base running should not be slighted by any player, for it is a real qualification in the make up of a student of the game. Good base runners do not have to be fast on their feet, although speed is always a great asset; a greater test of ability is to keep the eyes open and the head up. A fumble, a hesitation, or play that puts an outfielder in a non-throwing position gives the runner a chance to advance an extra base, and he must always be ready to seize such an opportunity.

Base running is not a simple part of the game. It requires much observation and study, especially of the opposing battery men and outfielders. Heady, alert base running wins many a ball game, and stupid, indifferent base running loses just as many.

One of the greatest errors of judgment a base runner can make is to let himself be picked off a "scoring position" base after reaching it safely. Such a misfortune means that the base runner either is not thinking or is over-anxious.²

¹Ethan Allen, Baseball Play and Strategy, p. 211.

²Danny Litwhiler, Baseball, p. 120.

The art of sliding makes good base runners out of average base runners. Most players will not advance from first base to third base or score from second base for fear of having to slide. Players who are skilled in sliding know how to slide really enjoy running bases and try for extra bases.

The purpose of sliding is not to frighten an opponent, but to prevent the runner from being tagged and overrunning his base, as well as to give the baseman the least amount of a runner's body as possible to tag with the ball for an out. Any deliberate attempt on the part of the runner to spike or injure his opponent should never be tolerated. It is never necessary or justifiable.

Here is a cardinal rule on sliding which should never be violated. When a runner has made up his mind to slide into a base, he should slide into the base. He must not hesitate by listening to false information given him in a friendly manner by opposing infielders; nor should he listen to the instructions of his coaches unless he is far enough away from the base so that his neuro muscular response can be mentally regulated for a different action pattern and especially if he is already in the air. More sprained ankles, broken legs, and other injuries are inflicted on base runners by this mental lapse than by any other play action. "I will slide-no I won't," is a dangerous and worthless technique. Sudden stops, halfway slides into the base, and slides which carry the body over the base have caused much physical damage to ball players.³

There are two ways of sliding into the bases: head first or feet first. The head first slide is the most dangerous one and is very seldom used, except by expert ball players. Risk of injury to the head, arms, or hands is too great for the average ball player. So for the purposes of this paper emphases will be placed on sliding feet first.

³Ibid., p. 122.

There are many types of slides that have been passed down through the years, but the one slide that is now adopted by most coaches and major league teams is the basic bent leg slide. There are six variations from the basic slide. The teams and coaches have adopted this form because it has cut down on injuries and the variations can be taught by just one basic slide.



Figure 1

The basic bent leg slide is a combination of a three point landing. The three points of the landing are the buttocks and the instep of the tucked leg. The other leg is extended into the air. When a boy learns to tuck one leg he should always tuck the same leg by doing this he will avoid injury, Also to avoid injury the basic and all preceeding slides should be performed on the grass with shoes off. (Fig. 1.)

The pop up slide is the same as basic bent leg except that the lead leg is snapped down to the ground in order to bring your body into a standing position. The player should use this slide when the ball is behind him and also on the possibility of an overthrow, because it is extremely hard to field the baseball with a sliding player standing up in front of the baseman. (Fig. 2.)

The hook slide can be made to either side of the base so there are really two variations off the one slide. The slide is the same as the basic except that the slider slides to either side depending upon the direction of the ball.

The player tries to hook the base with his hand and thereby avoid the tag. This type of slide only permits the baseman the hand as a target with which to tag and it is a tough job trying to tag a runner sliding away from you with only a hand to shoot at as illustrated in (Fig. 3.)



Figure 2



Figure 3

The take out slide is a little different than any of the remaining or other slides because in this slide the slider rolls on his side and thrusts the shins into the baseman's shins in order to interfere with the baseman thus causing him to change his motion and result in an abnormal adjustment. The intention is not to spike or kick the baseman because the chances are much greater for injury to the slider than could possibly be for the baseman. The intent of the slide is to follow the baseman wherever he goes in order to cause a possible distraction which may result in a bad throw. The slide is nothing more than the basic slide with just a rolling

action to the side. (Fig. 4.)

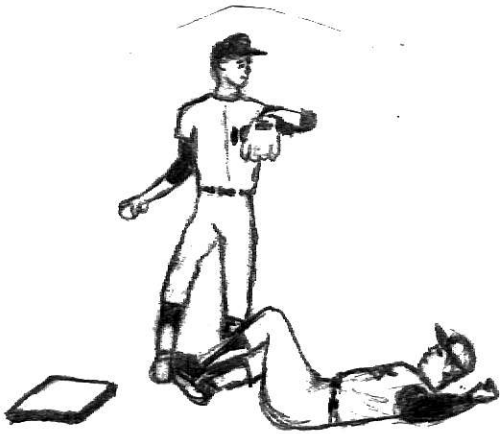


Figure 4

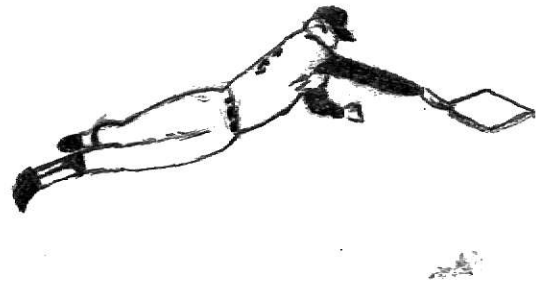


Figure 5

The layout slide is used when the slider is sure to be tagged out. This slide is made about six feet away from the base, and the layout is the same as the basic slide except that the baserunner slides late and rolls over and scurries the back side of the base. The slide is designed to get the base runner as far away from the baseman as possible and still be able to reach the base. (Fig. 5.)

Sliding is very important whether you are a coach or a player. Sliding should not be neglected. Sliding can well mean the difference between winning and losing or more important a safety factor to prevent injuries.

The instant the batter hits the ball he becomes a base runner, and from then on he must never loaf. The player should run out every hit, regardless of the direction of the ball. No matter how expert an outfielder may be there

is always a chance that a ball might be dropped. The best of the infielders occasionally makes inexcusable errors and bad throws. Nothing can be taken for granted in baseball. First base is the batter's objective, and no player can be excused for not making every effort to reach it. The good base runner is never satisfied with one base, he is always looking for a break in order to advance to another base.⁴

Every batter, whenever a ball is hit to the outfield, starts as fast as possible, upon reaching first base a pivot is made on the bag, while intently watching the ball as it is being played by some member of the defensive team. On any misfielding play in which the outfielder is placed at a disadvantage, the runner makes every effort to take an extra base.

The batter never slides into first base except to avoid being touched by the first baseman, or in case the latter has been pulled off the bag in order to catch the ball. A slide under any condition means a loss of speed and time. The slide is made to avoid overrunning the base, but the batter is allowed by the rule to overrun first base, and every advantage should be taken of this rule. The batter, now the base runner, should do nothing to slaken his speed until the first base bag is touched. If he runs hard and the throw is wild, then there is no lost motion in his attempt to advance to second base. It is to the runners' advantage to tag the front edge of the base in attempting to beat out an infield hit. Never hit the middle of the bag or miss the bag on an obvious out. Hitting the middle of the bag adds distance to the run and enhances the chances for injury to the ankle. Missing the bag is a foolish mistake because the first baseman may juggle or drop the ball.⁵ After the

⁴Ibid., p. 119.

⁵Ibid., p. 221.

runner has touched the base he must stop as quickly as possible and turn toward the foul line and try and locate the ball. The player must have good eye contact because if there is a wild throw and the ball is located immediately one can react much faster than waiting for a signal from the coach. In base running one must always remember the fundamental principle, that the shortest distance between two points is a straight line, and the base one is attempting to reach should always include the straight line principle. In the following diagrams, good base running techniques are shown with emphasis placed upon the straight line principle.

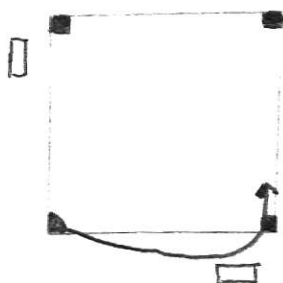


Figure 1

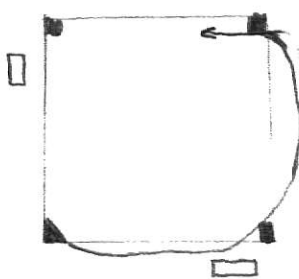


Figure 2

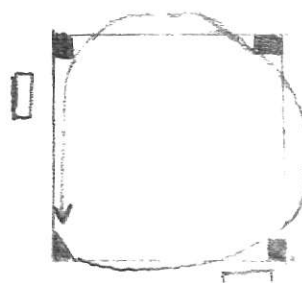


Figure 3

In base running one speaks in terms of possibilities or chances of being safe at the following base. Figure one shows the runner and his possibility for a double. A wide turn is made at first in order to have a straight line to second. This turn is taken for two reasons one is the fact that normally there is better footing in the grass and the second is the fact that by knowing that one is running in a relatively straight line the head can be held in an upright position to locate the baseball and still not lose any time or distance on the ground.

Figure two is the same as one except that the hit is a possible triple and figure three is a possible home run. A player knows that reaching first base is for certain, and trying for the next base is a possibility.

Base running has one basic step which need to be practiced constantly. The step is called the basic crossover step. Many sports use this step for quick starts and fast movements. As the name implies one foot crosses in front of the other with a sprinters push off with the back foot. This gives one a driving force which produces tremendous explosion power for the base runner as well as a quicker start which may enable one to steal bases as well as get a quicker jump on hit baseballs. (Fig. 6.)

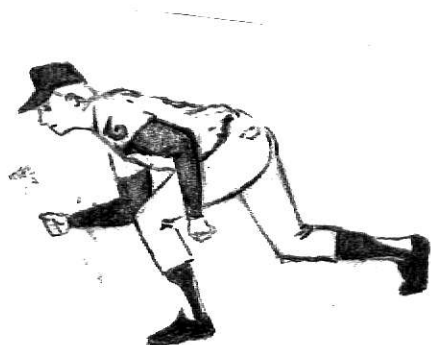


Figure 6



Figure 7

HITTING

A player must have a certain amount of natural ability to be a good hitter. Natural ability includes such things as quick wrists, good eyes and good cordination between mind and the body. But natural ability alone will not make one a good hitter.

To be an aggressive hitter a baseball player must have confidence in

his ability to hit any pitcher that walks out on the mound.⁶ The basic essentials to good hitting, along with aggressiveness, are the learning of the fundamental skills. Fundamentals are of much importance in hitting, however before one can delve into the fundamentals there must first be an examination of the qualities that lead up to the fundamentals.

The selection of the proper bat a player swings will make considerable difference in ones ability to hit the baseball. Too many players have the false idea that a heavy bat means more power and more home runs. Nothing could be farther from the truth. A player must select a bat he can swing with confidence, and the least amount of effort, rather than a bat that will swing him.

A player must also have a knowledge of the strike zone and not only the umpires zone but also his own zone or the zone in which he makes best contact with the baseball. The player must be aware of the count and the game situation. A lot may depend upon his ability of selection when deciding on the best pitch to hit. Swinging at bad pitches results in lower individual, and team, hitting averages.

One must have a general mental picture of a pitcher and his pitches. For example if a pitcher throws the ball over the top which way will the ball break, or curve. The batter must have some idea of these things before going to the plate.

Timing is also very important and should be worked on constantly. A player must be able to time the pitches in order to hit the baseball well. Practice, practice, and more practice will help to improve one's timing.(Fig. 7.)

⁶Al Lopez, Baseball, p. 134.

FUNDAMENTALS

Almost all coaches would agree that the grip should be comfortable and positioned correctly in order to effectively swing the bat. Basically there are two such types of grips or ways of aligning the knuckles that merit discussion in order to properly position the hands on the bat. One such method is that of keeping the second knuckle of the top hand in line with the base knuckles of the bottom hand. The second approach, not differing greatly from the former, is that of having the second knuckle of the top hand intersecting the second and base knuckles of the bottom hand. (Fig. 7.) Either one of these grips seem to be widely accepted and employed as both provide and facilitate wrist action so that the wrists have freedom of motion on contact. According to Jack Coombs, "At no time should the middle knuckles of the top hand line up beyond the base knuckles of the bottom hand."⁷ This apparently would not allow proper wrist rotation and possibly hinder the swing. If gripped properly, the top hand, when the bat meets the ball, should be in a position so that if the hand were open, the palm would face the ball. Tony Russo,⁸ who has designed a certain iso-swing resistance device for better hitting feels that the grip controls the strength and flexibility of a swing, and that by positioning the lower knuckles of the top in line with the bat label while at the same time keeping the lower knuckles aligned with the upper knuckles, a faster and more efficient swing will result. In other words, this positioning would allow for extra dorsal flexion for the bottom hand roll and prevent the top wrist from overflexing dorsally. This quite obviously would affect the speed of the swing

⁷Jack Coombs, Baseball, p. 109.

⁸Tony Russo, "Iso-Swing Way to Better Hitting," Scholastic Coach, (January 1966), p. 19.

and might possibly cause a slow bat.

In regards to the bat speed or swing power, the grip seems to play a very important role. Hand positioning in favor of power is one in which the second set of knuckles are aligned with the same set of knuckles on both hands which in effect should permit wider range of motion, greater wrist snap, and hence more generated power.⁹ Whether one grip is superior to another is not known but apparently the type employed will certainly affect the kind of swing that will result.

Also to consider in this discussion is the strength of the grip, which like the positioning of the hands, can greatly affect the swing. A general consensus of opinion from many coaches seems to be in favor of a rather firm grip, yet not to the point of interfering with any phase of the swing. More specifically, the grip should be firm during certain phases of the swing and relaxed at other times, or light prior to the pitch, or backswing and more firm until during the swing when the bat is held very tightly. Dr. Lande¹⁰ pointed out that the grip should be firm, not taunt, up until immediately making contact with the ball and that in order to obtain maximum power and resistance at the point of contact, full tenseness would be imperative. In view of this, it is important to note that if the hand muscles, or any muscles for that matter, are tensed for more than six seconds, they will begin to fatigue and lose their effectiveness. This physiological principle would seem to substantiate the position held here although a study conducted by Hooks¹¹ in trying to determine a predictive relationship of grip strength and hitting

⁹ Leon A. Lande, "The Problem of Hitting," Athletic Journal, (February 1964), p. 13.

¹⁰ Ibid.

¹¹ Eugene G. Hooks, "Prediction of Baseball Ability through an Analysis of Measures of Strength and Structure," Research Quarterly, (March 1959), p. 43.

success was negative indicating a need for further research in this area. It can be assumed that a modulation of grip strength in accordance with the various phases of the swing is most effective and desirable. Also since the top hand is apparently more responsible for the power of a swing, it seems logical to hypothesize that a more relaxed top hand would be instrumental in providing greater wrist action or rotation, but this will be discussed in more detail later.

In this discussion on the baseball grip, it should be emphasized that the position of the hands and degree of grip strength will depend to a great extent on such variables as the weight of the bat, strength of the batter, and the batters preference in the use of hands. It would seem essential and fundamental in any correct grip to emphasize holding the bat primarily with the fingers, not palms, as to promote control, positioning the hands so as not to lock the wrists and interfere with the wrist action, and also to vary the strength of the grip proportionally with the phases of the swing.

At this time, a general discussion on the various body positions prior to hitting the baseball or in the stance is necessary. The primary function of any stance is to place the body in such a position so that the forces of swing can be developed and utilized effectively. As mentioned before, the seemingly cardinal principle for most mechanical skills is to be in a relatively natural and comfortable position. This is especially true in the stance.

The stance is generally taken with the batter facing the plate and with the inside shoulder pointing directly toward the pitcher. The width of the stance will vary, but a wide stance with the feet spread well apart seems to be much preferred by most coaches. "A starting position with the feet spread wide is one to furnish a firm base, permit movement of the body mass and to

facilitate or make a pivot possible with disturbing balance."¹² This will determine the stride, which will be discussed later, because if the feet are not spread relatively wide, there seems to be a tendency to over stride when the base of the feet is narrow. Once this firm base is established, the knees should be slightly flexed and the trunk slightly inclined in order to permit freer arm action. (Fig. 7.) This position would also help to lower the shoulders so that the swing will be more horizontal. Most coaches feel that the weight should be evenly distributed on both feet, but Ty Cobb, one of the games most prolific hitters, felt that greater balance could be achieved by placing more weight on the front foot than on the back one.¹³ Also in regards to the trunk position, some hitters prefer to crouch in the stance, exemplified by the famous ballplayer, Stan Musial, who had one of the most unorthodox stances in baseball. The obvious disadvantage in using this type of stance was made clear by Lande,¹⁴ who pointed out that by initially using a crouch requires changes in the degree of crouch during the swing with the probability of a hitch resulting. Apparently Mr. Musial was able to compensate for this handicap, but it certainly would not be recommended. Regardless of the exceptions, oftentimes compensated for by other hitting attributes, a stance with a wide base, weight evenly distributed, and a slight body lean would be advocated.

There are basically three types of stances which vary slightly in the positioning of the feet which can have some affect on the swing. In the open stance, the front foot is relatively farther from the inner edge of the batter's

¹²Gladys M. Scott, Analysis of Human Motion, p. 238.

¹³Lew Watts, Fine Art of Baseball, p. 231.

¹⁴Lande, loc. cit.

box than the rear foot. A stance of this type will facilitate hip rotation and would be recommended for players who have less mobile hips. The second stance is that of placing the feet straight away or square, where both feet are parallel and approximately the same distance from the batter's box. This stance seems to be the most widely used and forces the batter to hit the ball according to its relation to the plate. The third and last type is a closed stance in which the front foot is closer to the inner edge of the batter's box than the rear one. This stance prevents the hips from rotating as far, nor can the arms move in front of the body thus causing a tendency to hit to the opposite field. The relative value of any one stance over another would ultimately depend on the attributes of the hitter utilizing them and the position of the pitched ball. Obviously no one stance can be unequivocally proven to be better than another, but the implications of this brief analysis should provide some basis for possible selection and use.

There are some other aspects of the stance that will be incorporated into another preparatory hitting movement or that of the backswing. In a brief overview, the type of stance of course will vary according to the individual, but certain fundamentals, as mentioned, seem to be applicable in all cases. The importance of the stance cannot be overemphasized, for a good stance will almost inevitably end up in a good swing.

In the analysis of the stance, reference was made to another preparatory movement which is a direct result or consequence of the stance itself. The body movements prior to the swing is called the backswing, which is actually a continuation of the stance, but for purpose of clarification here it will be treated as a separate movement. The backswing actually consists of certain actions which are as follows: A transferring of the weight to the rear foot,

a rotation of the trunk, and positioning of the bat behind the head. Scott¹⁵ in her analysis of sport skills reports that the weight is transferred by a slight cocking of the hips (20 to 30 degrees) or where the right leg and thigh rotate medialward and the left leg and thigh rotate lateralward (left-handed batter.) Thus as the ball is delivered the rotation of the hips shifts the weight to the back foot where it is apparently held until the last possible moment and then thrown forward as a result of the uncocking of the hips.

The position of the arms and bat in relation to the body is not quite clear although some studies have been made in this area that are worthy of mention. In a study by Donald Race, an attempt was made to correlate the preparatory batting movements with the batting and slugging averages of a sample group of professional ballplayers, who had a minimum batting average of .275. He reported that "The mean distance that the hands were held from the central axis of the body was 22.8, the total degrees of bat recoil 107.5, and the cocking action of the wrists 19.6."¹⁶ The correlation was insignificant and therefore assumed that these movements were simple habits generally maintained over the course of the season. They could only be justified in terms of being comfortable, relaxed, or gaining preparedness. Although the findings were inconclusive, it can generally be assumed that the bat and arms should be held out away from the body at a comfortable distance of which will probably vary considerable for the individual. To illustrate, Stan Musial was reported to hold his hands approximately 24 inches away from the body before the swing.

¹⁵Scott, op., cit., p. 234.

¹⁶Donald E. Race, "A Cinematographic and Mechanical Analysis of the External Movements Involved in Hitting a Baseball Effectively," Research Quarterly, (October 1961,) p. 403.

This is undoubtedly an extreme case but should point out the variations to be expected.

Also of equal importance is the position of the bat prior to the swing, often held in either a horizontal or perpendicular position and sometimes between the two extremes. There are some who contend the perpendicular is more relaxed and would contribute to more power, where others support the horizontal in terms of accuracy. The most enlightening discussion on the subject was offered by Lande,¹⁷ who supports the horizontal not only from an accuracy standpoint, but also because it would be easier to execute more effectively. This is logical since the ultimate path transversed by the swing must be horizontal and a straight line path would be simpler and faster. The perpendicular position would obviously be much more complicated and thus require a higher degree of coordination. Also pointed out by Lande was the fact that when the bat is held perpendicular there is a tendency for the elbow to be raised higher, making for a less stable position, and preventing the batter from maintaining a uniform grip.¹⁸ In light of this information, the horizontal position would seem to be the most desirable and effective way of holding the bat.

Another question regarding bat position often raised is the distance of the bat in relation to the body. If the purpose of the swing is to develop an optimum of momentum, then as much angular movement as possible should be affected thus suggesting a rotation of the bat as far back as possible in preparation to strike a ball. Added support to this contention was provided

¹⁷Lande, loc., cit.

¹⁸Ibid.

by Kitzman,¹⁹ who discovered, in an electromyographic study, a considerable difference in the bat positioning of an unskilled as opposed to a skilled group of subjects. His findings indicated the skilled subjects consistently brought the bat farther at the start of the swing. Also of interest is the fact that a hitch (batting fault) is actually an extra movement not required in the actual swing that usually occurs when the bat is held forward and then taken back while the ball is in flight. Thus by holding the bat well back in a pulling position, not only could more momentum be developed, but a possible hitch might be avoided.

Before concluding this section on the backswing, some consideration should be given to the position of the arms and also the relative value of moving the bat during the backswing. Not much attention has been given to the position of the arms, although as mentioned previously, most batters tend to hold the forward arm parallel to the ground with the elbow relatively high and away from the body. Morehouse²⁰ would place more value in holding the elbow high as this seemingly provides for a more linear transfer of momentum from the shoulders through the arms to the bat. Remembering the effect of a high elbow in the perpendicular batting position should also serve as a word of caution here as they appear to serve different functions. Also prior to the swing, the arms, as a result of the hip rotation and bat position, would go back slightly while the body is held straight. The exact amount of movement involved here is not known, but it obviously would be extremely minimal. No information is available

¹⁹Eric Kitzman, "Electromyographic Study of the Batting Swing," Research Quarterly, (May 1964), p. 176.

²⁰Lawrence E. Morehouse, Kinesiology, p. 348.

regarding a moving bat prior to the swing, but a logical conjecture will be made. Assuming that any extraneous movement, not vital to the performance of a skill, is undesirable, then a backward or forward motion of the bat would seem a hindrance to good hitting.

In summation, the backswing is initiated by a slight hip rotation that transfers the weight to the rear foot. Accompanying this would be a slight rearward movement of the arms, being held away from the body with the elbow relatively high, and the bat, being held in a horizontal position with little or no movement involved, and as far back as possible. Although the action or movements in the backswing are of such a nature that might go virtually unnoticed by most observers, they are a very vital and integral part of the entire swing complex.

The next phase or mechanical movement chosen for analysis is that of the stride which is in fact a unified function of the swing itself. The stride can be defined or described as a forward step taken by the batter in order to transfer the weight from the rear foot to the front foot and to allow the body to rotate forward by the hip pivot for the most force. This movement is almost a reversal of the backswing as the trunk rotation is just the opposite, inward and outward, with the body mass now moving in a counter direction. With this function in mind, a closer examination is desired.

As mentioned, the stride is initiated by a forward step, in which the front foot is lifted in order to enable the body to move forward. This step, according to Bunn²¹ should be just high enough to clear the surface and no more. Obviously this would lead to better control and balance that are so essential

²¹John W. Bunn, Scientific Principles of Coaching, p. 63.

in all sport skills. As will be discussed later, this step is particularly, not to any great extent, dependent on the length of the stride. Once the base is again reestablished by the front foot or a completion of the stride is attained, the action is finished. Once this front leg is planted it becomes the base of all rotary action, with the rear foot action as a stable fulcrum.²² (Fig. 8.)



Figure 8

The stride can affect other parts of the body, such as the arms, shoulders and hips, to the extent that most hitting theories invariable relate to the length of stride and stride consistency. There is no ideal stride length although the consensus of many coaches opinions seems to favor that of a short stride, or a stride shorter than the original spread of your stance. The proponents of the relatively short stride contend that "In a long stride the

²²Morehouse, op., cit., p. 347.

hips are locked, thereby causing the body to fall away from the plate with a consequent loss in power."²³ Another proponent by the name of McConnell²⁴ asserts that a batter taking a long stride is handicapped since he must commit himself earlier and would have less time to follow the ball. History reveals that Lou Gehrig, with all of his prowess as a hitter had this one bad habit. Obviously many successful hitters have employed the use of a long stride, apparently for more force, but the general trend today is toward a short consistent one.

In view of the short stride is the concept of stride consistency which was given great impetus by the Bunn principle that it is less complicated to alter muscle action within the body than to change the position of the body as a whole.²⁵ In other words, when confronted with many various pitches, it would be easier to vary the swing rather than the stride. Also important to notice at this time is the relation of stride consistency to the stance and length of stride. As mentioned earlier, the feet should be spread relatively wide in order to obtain a wide base, for if the base is narrow the stride is apt to be long, and Lande,²⁶ through many observations, discovered that a player definitely has more difficulty in taking a consistent long stride than a short one. This is further validated by the previously mentioned Kitzman²⁷ study, as his group of skilled hitters showed a much more consisting stride,

²³Bunn, op., cit., p. 65.

²⁴M. McConnell, "Bat Control in Hitting", Scholastic Coach, (March 1967), p. 7.

²⁵Bunn, loc., cit.

²⁶Lande, op., cit., p. 65.

²⁷Kitzman, loc., cit.

where the unskilled were between the two extremes of strides of either too little or too much.

Another important aspect to discuss is the relationship of the stride to the swing. The force or drive given to the swing is a result of this interaction between the two, because the increased range of motion created by the stride allows a wide latitude for the development of momentum. Without getting into reaction times, it becomes apparent that the stride must be geared somewhat to the release of the ball and the start of the swing and duration of the stride would thus be dependent solely on various ball speeds. Again Lande, in one of his many articles, points out that "The stride should precede the swing slightly or in terms of speed, approximately 1/24 of a second ahead of the swing."²⁸ This in effect is the difference between the time the striding foot hits the ground and the bat contacts the ball. The timing implied here cannot be overemphasized for the drive given to the ball is a result of this stride or weight transfer. If for example the weight over his front foot, the batter will not only have to wait for the pitch to come in, but also will have very little power or momentum to his swing. Coombs has determined the contact point to be at the instant the weight of the body is equal on both feet.²⁹ Thus the bat should never meet the ball before or after the stride has been taken.

Not much emphasis has been placed on the direction of the stride, but for the most part, it would be straight toward the pitcher. Variations are not uncommon though for many hitters are plagued with the fault of "Stepping in the bucket". By this the batter takes his stride out and away from the

²⁸Lande, op., cit., p. 66.

²⁹Coombs, op., cit., p. 110.

direction of movement, therefore improperly aligning his body as his hips are locked and useless. Somewhat contrary to this fact is the offering by Bunn³⁰ in which a slight step away from the plate is advocated in order to provide a wider swing arc. Since no follow up studies have been conducted, it can be assumed that a slight deviation in direction of the stride would have no profound affect upon the swing and might in some cases be of relative value depending on the position of the pitched ball.

Utilizing the basic preparatory movements and the stride, the hitter is now in position to execute the forward swing or that of swinging the bat on a horizontal plane through a long arc that is controllable in the least amount of time. The swing is actually a result of the body mechanics discussed previously, with certain body movements being distinct in the final execution. These movements would concern the arm and bat relationship, leg and hip movement, and wrist action at contact which would culminate at this particular phase. Our primary emphasis will be on the actions involved in swinging the bat forward to the striking point.

In the forward swing the bat ideally should travel in a nearly horizontal plane in order to meet the ball at a right angle to the path of the approaching ball. Scott states that in the forward swing, the bat travels in nearly a horizontal plane unless hitting a low ball.³¹ The batting swing has often been compared in geometric terms to that of a parabola which starts out at a downward arc and then levels off; varying slightly according to the height of the pitch. As mentioned in the stance and backswing, this can be accomplished by holding the bat horizontally at an acute angle with the right forearm practically

³⁰Bunn, loc., cit.

³¹Scott, op., cit., p. 238.

horizontal to the ground. Also contributing to a more horizontal swing would be a forward inclination of the trunk which would make the arm action freer and help lower the shoulders.³² Again the weight transfer can affect the plane of the swing, for oftentimes if the weight is not on the front foot, remaining on the rear, a tendency to uppercut or swing up at the ball can result.

The sequence of movements involved in the swing is indeed complex, but can be somewhat analyzed through the use of cinematographic techniques. As mentioned before, the stride initiates the swing, preceding it by 1/24 of a second. After the stride, the forward foot is firmly planted with the leg extended at the knee joint forming a base for all rotary action. This rotary action starts at the hips ahead of the bat and is followed by a twist of the trunk which pulls the shoulders away from the bat and allows the arms to pull freely into the swing. The arm action seems to be that of pulling nature, not pushing, for the bat or lever is actually set in motion by the extension of the right elbow (left-handed batter), which extends the bat beyond the hands. As the wrists move from full abduction into adduction or wrist snap, the forces have reached a peak and it is desirable to contact the ball at this point. According to Lawther, "Wrists snap at the last instant in striking acts are last moment accelerations that literally go into the object hit."³³ At this contact point, the right shoulder is slightly nearer the pitcher with the weight evenly distributed on both feet. Also relevant at this point is the position of the head which must be held steady and somewhat aligned with the hips and shoulders. The actual start of the swing was an uncocking of

³²Ibid.

³³John D. Lawther, Psychology of Coaching, p. 304.

the hips or a lateral ward rotation of the right leg and thigh and medialward rotation of the left leg and thigh (left-handed batter). This hip rotation and the wrist action mentioned are probably the two phases of the swing that must be synchronized to some extent in order to produce more power with less effort. Scott³⁴ in her book points out the importance of the wrists in controlling the bat for accuracy and timing and that the hip rotation would vary slightly with the type of pitch. For example, on an inside pitch inward rotation could be used where outward rotation might be more effective for an outside pitch. Lande³⁵ observed that Ted Williams, one of baseball's greatest hitters, employed a dominant inward rotation on all types of pitches and consequently tended to pull in this direction, but offers two advantages in using the latter. He purports the use of outward rotation would enable the batter to extend his arms farther for better plate coverage and secondly the change of bat angle would result in balls being hit to all directions. In any event, the swing must be perfectly timed and the type and amount of rotation determined in accordance with the type or speed of the ball and reaction time of the batter. As mentioned previously, inward rotation might increase the arc of the swing where in outward rotation the hips are locked and do not permit the body to rotate as far. The choice appears to be arbitrarily determined, although a dominant use of either in any case would not be advocated.

At the termination of the swing, the knee of the front foot should be locked showing the batter has this pivotal foot on the ground. As mentioned in the stride, the purpose of this extended leg was to act as a firm base.

³⁴Scott, loc., cit.

³⁵Lande, op., cit., pp. 65-66.

To reiterate this function, Lawther states the purpose of this extended leg, over which striking occurs, is to give a rigid base to this radius where accuracy can be adjusted and no force is dissipated.³⁶ Also of some importance is the position of the rear foot which varies considerably among hitters. In most cases, this foot remains in contact with the ground, although many good hitters (except Willie Mays) actually lifts the rear foot as can be discerned by simple observation. In an article by Weiskopf,³⁷ the consensus of opinion seems to support the planted rear foot by the fact that body balance would be enhanced in this process of weight transfer. Since the weight is on the front foot, some rear contact appears necessary in order to aid in promoting balance.

All of the complex movements involved in the swing are so interrelated and interdependent that in order to produce an effective swing, a proper sequence would be essential. An attempt to scrutinize the mechanics of hitting was performed by Donald Race, who by the use of cinematographic studies made certain analyses based on measurements computed in terms of Newtons formula concerning the laws of motion. Particularly interesting and applicable in this discussion on the swing are his findings regarding the relative velocities of the major body segments involved in the swing.

"Based on a 90% arc, the computations showed that the hands and wrists traveled fastest for 15 of the 17 hitters tested. Based on an 80% arc for hips and a 90% arc for the hands and wrists, the latter were fastest in each case. Based on an 80% arc for hip rotation and 100% arc for the hands and wrists, the hands and wrists were also employed in the fastest manner by each hitter. In every instance the movement of the foot in the stride was slowest."³⁸

In conclusion, the findings seem to indicate that the rotary motion involved

³⁶Lawther, op., cit., p. 296.

³⁷Don Weiskopf, "Rear Foot in Batting", Athletic Journal, (February 1964), p. 11.

³⁸Race, op., cit., p. 397.

is dependent on rather dramatic hip rotation with the final culmination of wrist action being paramount in effective hitting. It should be obvious now that precise timing of the body segments is so essential in producing an effective swing. The overall complexity involved in such a process should serve as a precautionary measure to all baseball coaches.

Akin to an analyses of the swing is some investigation into the nature of the forces that can determine the speed of the swing or bat velocity. Having determined the relationship of the body segments in terms of mechanical application, it is obvious that maximum swinging speed is attained as a result of a combination of such factors as weight transfer, body rotation, swing of extended arms and others. The real problem involved in all striking movements is to meet and overcome the force of an oncoming ball by a certain force differential, so that the ball will travel a great distance.

The forces accumulated during batting are developed from the actions of the body parts to produce the forward motion of the body and of course the swing of the bat. There apparently is a certain point or peak in the swing where most forceful contact is possible and past this point the swing of the implement is reduced. Morehouse³⁹ in a review of batting force contends that maximum speed is attained when the implement is approximately 6 inches beyond the midline of the body and that a slight increase on the handle will decrease the radius and thus increase the rotary speed of the bat. Obviously difficult to determine with certainty, a contact too early or too late will adversely affect the swing speed and the force imparted to the ball.

Considering the implications of the arms and hands in affecting bat speed

³⁹Morehouse, op., cit., p. 342.

it seems logical to investigate the initiation of the movement or the muscular contraction responsible for this speed. A slight controversy, to an extent, exists in the assigning of relative value to the arms in providing power to the swing. Some coaches consider the forward arm in terms of accuracy, feeling the rear arm supply power, while other coaches believe just the opposite. A similar view is proposed by Russo in the statement: "The bat is triggered by the explosive strength of the lower arm or power arm and that the top hand exerts the dynamic strength during and after impact."⁴⁰ Somewhat contrary to this view is the opinion of Coombs,⁴¹ who feels the front arm guides the bat in a horizontal position, acting as a puller, while the rear arm is providing the impetus to the swing. In considering the evidence available, it might be well to assume that power is provided by both arms, possibly varying somewhat in degree or amount. Referring again to Kitzman's⁴² study, the measurements of action potentials of certain muscle groups indicated that most contraction came early in the swing, particularly the left triceps brachii (longhead), or forward arm, which recorded the strongest action potential. Thus he concluded that a more ballistic movement was used by the skilled subjects and that a strengthening of this muscle would increase their batting force. Whether this finding would lend itself in support of the front arm power theory is not know, but increasing evidence seem to point in this direction. Litwhiler,⁴³ a coach at Michigan State, has concentrated on strengthening the front arm or

⁴⁰Russo, loc., cit.

⁴¹Coombs, op., cit., p. 111.

⁴²Kitzman, loc., cit.

⁴³Danny Litwhiler, "Overload for the Quick Bat," Athletic Journal, (January 1967), p. 22.

extensors of the humerus (triceps), which he feels contribute the most power to the swing. Also of interest is his related finding of the major role played by the adductor of the scapula and the relative minor function of the biceps of this arm. Regardless of these findings, the answers are still nearly 50% for each, never being scientifically proven to the satisfaction of everyone.

In concluding this discussion on bat or swing speeds, a couple of relative findings should be mentioned. Breen⁴⁴ in determining the bat speeds, measured in hundredth of a second, reported that the average hitter's speed to be .28, where great hitters such as Musial, Mantle, and Mays have speeds ranging from .19 to .21. The obvious implication is that in being able to propel the bat at such speeds can allow these hitters to start the swing a little later thus enabling them to see the ball longer. Other findings in this area were reported by Seng,⁴⁵ who found that professional ballplayers varied from 1/4 to 1/6 of a second from the start of the swing to the time the ball came into contact with the bat and that the swinging speed varied between 55 and 80 miles per hour. He found this swinging speed to be constant; not varying with the speed of the pitches. The implication here seems to attribute most of the success in hitting to the ability to start the swing at the right time rather than the actual speed of the bat. Obviously being able to start and complete the swing in the least amount of time is essential in effective hitting.

The all important factor of balance, although referenced several times in this discussion, has not received the attention that it deserves. Most coaches

⁴⁴J. L. Breen, "What Makes a Good Hitter," Journal of Health, Physical Education and Recreation, (April 1967), pp. 36-39.

⁴⁵C. H. Seng, "Visual Movements of Batters in Baseball" (Reported from his unpublished Master's Thesis by Coombs), loc. cit., pp. 148-152.

actually feel that balance is the most common attribute of a good hitter, exemplified by the statement; "One thing that all good hitters maintain in their stance and swing is balance,"⁴⁶ Thus apparently in order to execute the body movements and hit effectively, the balance of the batter must not be disturbed.

In previous analyses, the element of balance has more or less been implied for it is present in the proper weight transfer and forward motion of the body. In kinesiological terms, the body as a whole moves in a linear fashion with the various parts undergoing rotary, ballistic and translatory type movements. Functionally, the body and its parts must move the same distance, in the same direction, and at a uniform rate of speed or balance will be affected. During this complex movement, the batter should always be in a state of equilibrium or in the process of doing so. More specifically, the center of gravity should always lie within the base of support. For example, sometimes we observe a batter swing so hard that he actually falls down or more aptly described in baseball terms as trying to kill the ball. What happened was that there was a scattering of the forces and a hurried sequence of timing which occurred because his equilibrium became unstable (center of gravity carried outside his base of support) due to the great momentum built up during the swing. According to a statement by Morehouse, "Any change in the acceleration of the swing will adversely affect the equilibrium and consequently disrupt the force and accuracy of the swing."⁴⁷

Now realizing the importance of balance and proper weight transfer in the swing, the question of how professional hitters can control their body

⁴⁶Donald K. Edwards, Baseball Coaches Complete Handbook, p. 136.

⁴⁷Morehouse, loc., cit.

movements during the swing to avoid losing balance often arises. Breen⁴⁸ found that the center of gravity must be maintained well between the base of support and that poor hitters tend to have the center of gravity on a downward trend. This can be better understood by examining the body positions during the entire swing in relation to the center of gravity. In the stance the body is extremely stable with the center of gravity maintained. When the weight is transferred onto the rear foot the body becomes less stable as the center of gravity moves away from the base. This is also present when the forward leg is raised to step forward as there is less friction with one foot off the ground. However, when the front foot again makes contact the stability is regained and the base of support is reestablished with the center of gravity moving forward at a fairly level plane throughout the swing. Race⁴⁹ was also concerned with balance when he studied the amount of body incline during hitting. He hypothesized that a batter must lean backward in order to reduce the force of his swing and avoid losing his balance. The results, although not entirely conclusive, seemed to clearly substantiate his position and bear out his hypothesis. Thus without being relatively aware of their actions, most hitters undoubtedly display a slight lateral lean in their swings in order to facilitate and promote the balance for effective hitting.

Before completing the analysis of the body movements in the swing, a brief explanation of the function of the follow through is warranted, since no swing can be truly effective without a proper finish. The follow through, in a sense, could be described as a movement that prevents interference with the swing. It

⁴⁸Breen, op., cit., p. 38

⁴⁹Race, op., cit., pp. 400-401.

is actually a continuation of the entire movement only with diminished force. Lawther⁵⁰ analyzed high speed movies that clearly showed the baseball being momentarily flattened and continuing for a fraction of time after this or until contact was broken off. He thus described this follow through as existing from the instant of contact until the cessation of the swing would obviously result in a preliminary tenseness of the muscles, thereby sacrificing much force and accuracy. The follow through, if properly used, should result in a relaxed continuation of the swing and body movements until the body is reversed and the bat is over the shoulder.

The mechanical execution of the swing can be relatively perfect yet sometimes the hitter will fail to make contact with the ball. This consequence, will more than likely, be an error in the perceptual process, which in fact is a vital element in the swing complex. By this, process is meant the relationship of the head of eye movements involved in the swing. In our previous discussion of body movements, brief mention was made to the fact that the head should be somewhat stationary during the entire swing. Quite obviously, any unnecessary head movements will possibly distort the vision of the ball and adversely affect the hitting results. Also in line with faulty head movements is the costly error taking the eyes off the ball, for if one isn't looking at the ball, chances are it will not be hit.

Morehouse⁵¹ relates that in the act of receiving or perception, the eyes must follow the path of the ball in order to obtain an accurate picture of the time and location at which the ball will reach the striking point, and at this

⁵⁰Lawther, loc., cit., p. 298.

⁵¹Morehouse, op., cit., p. 348.

point the proprioceptive senses of the muscles must be employed in order to bring the bat to this point. This situation has been studied by Seng and Hubbard,⁵² who state that the batter awaiting a pitched ball is actually faced with two problems; one of sensory-perceptual and the other of motor-response. In other words, the hitter must track the baseball along the visual field, trying to predict when and where to swing, and then make an appropriate motor response based on this judgement. At this point is the controversy of whether a batter can actually see the ball when contact is made. In their analysis of eye movements, Seng and Hubbard report their findings:

"Watching the ball or usual tracking was accomplished with the head fixated and eyes moving. Conveyance and compensatory movements were found, but no evidence of staccodic jerks were noted. Tracking up to contact was not found and was apparently broken off at some point, as additional information would have been superfluous or visual apparatus was incapable of tracking at the high velocity or both."⁵³

Thus it could be assumed that when the swing is well under way, further tracking is unnecessary, although in certain circumstances might be possible.

Before concluding, the emphasis on proper head positioning should be examined, for any movement or alteration of the head, such as from the stride, crouch or body lean, can well require certain eye adjustments. Race⁵⁴ in another of his studies tried to determine the relative change of the level of the head during hitting and the general limits within which professional hitters govern their movements. In his findings of the 17 hitters measured, only one raised the level of his head in the changes from the stance to moment

⁵²A. W. Hubbard and C. N. Seng, "Visual Movements of Batters", Research quarterly, (March 1954), p. 42.

⁵³Ibid, p. 57.

⁵⁴Race, op., cit., p. 402.

of hitting the baseball, while the other 16 slightly lowered their heads. From this there didn't appear to be much of a correlation between the length of stride and head movements, but that the batters made an adjustment in the head position in order to get the best and longest look at the ball flight. Apparently the most desired asset in any batter would be a motionless head with watchful eyes.

Any hitter faced with the dual problem of assessing the location and speed of the ball, and making a motor-response must react in a certain period of time. For ones purpose, this ability to analyze the pitch and respond by swinging to whatever is offered is considered reaction time. A hitter must be fast enough to allow him to analyze and decide whether to swing or not, and finally to swing effectively in this rather short interval.

As mentioned previously, it was reported that the start of the stride was geared to the release of the ball, but the actual swing was dependent on the ball speed. It has also been found that with ball speeds of 60 to 90 miles per hour, the hitter has 0.45 seconds to observe the *flight of the ball*.⁵⁵ Obviously not much time is allowed for judgement and reaction necessary for effective hitting. Also extremely relevant was a study by Slater and Stumpner⁵⁶ in which they determined that in order to have a successful reaction time, the hitter must decide whether or not to hit a pitch when it is approximately half the distance (22-30 feet) from the pitcher and catcher. In this respect, reaction times could be used as an indicator of hitting success. Other attempts to compute the distance of the ball from home plate were made by Race,

⁵⁵Thomas K. Cureton, Physical Fitness of Champion Athletes, p. 94.

⁵⁶A. T. Hamel - Slater and R. T. Stumpner, "Batting Reaction Time," Research Quarterly, (March 1954), p. 356.

who determined the following results. "The findings show the pitched ball was a mean distance of from 20.3 to 27.4 feet from home plate in accordance with the ranges of the pitches at 0.43 and 0.58 seconds respectively."⁵⁷ Thus it becomes apparent from these similar results that the hitter has approximately 1/2 of a second to observe the ball and that some reaction must occur when the ball is at the halfway point on its path to the plate or approximately 1/4 of a second. Having some idea of the time involved in perceiving the flight of the ball and the time allowed to make a response, the problem now concerns the time or ability to accomplish this movement or reaction. This reaction time was found by Slater and Stumpner⁵⁸ to be approximately .21, but later rebuttal studies involving choice times increased this figure to around .29 - .34. Along the same line came a report from Bunn⁵⁹ that the reaction time for the average hitter is 1.10 of a second, but to place this figure into proper contest, Babe Ruth, being tested at the peak of his career had a reaction time of 1/20 of a second or twice that of the average person. This obviously gave him more time to study the pitched ball before starting his swing and undoubtedly contributed to his great hitting ability.

From these studies and reports, one can readily realize the limited amount of time that a player has in order to execute this complex swing movement effectively. The ability to perceive with accuracy, judge and react in the least amount of time are definite attributes of any hitter.

One of the newest mechanism to aid the hitters and the instructors is the new curve ball machine. The machine can throw either right handed or left handed

⁵⁷Race, op., cit., p. 399.

⁵⁸Slater and Stumpner, loc., cit.

⁵⁹Bunn, op., cit., p. 150.

curves and you may also vary the speeds of the curves in order to get your timing down. It is one of the best inventions to come along and help baseball in the last ten years. It should be a must for a good program. (Fig. 9.)

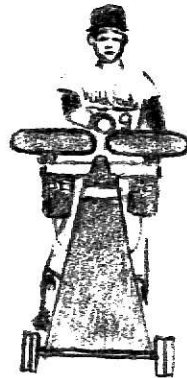


Figure 9

CONCLUSION

Before concluding the study, several remarks concerning the value of such an investigation should be made. By knowing certain attributes, can coaches predict the successful hitters or more feasible can he correct hitting errors that apparently result from a breakdown in these fundamentals? There is no direct or simple answer to these questions, but certainly by knowing the correct or right way to do something, some success should inevitably result. For example, slumps or hitting errors are undoubtedly caused by a breakdown in the mechanics or fundamentals and may continue in the form of bad habits or poor mechanics until corrected. Coaches, who are aware of the proper mechanics should not increase the practice per se, but attempt to analyze the hitter in such terms. Such an endeavor was made by Lande,⁶⁰ who devised an analysis chart for just such a purpose. To describe briefly, the purpose of this chart is to measure a hitter at his best performance level, and then if errors or faults arise, measure again to possibly detect the weak areas by a discrepancy. The charts conception was based on the idea that a simple movement can be substituted for a complex one, and in baseball, nothing could be closer to the truth. Also, in regards to the predictive value of certain mechanics, it is fair to say that much is desired. Hooks⁶¹ in his attempts to predict baseball ability has achieved little success, although he has singled out shoulder flexion as the best single measure found to predict this ability. Another device, called the McCloy Pendulum Test, which measures the accuracy and force

⁶⁰Leon A. Lande, "Analysis Chart for Hitters", Athletic Journal, (February 1967), p. 26.

⁶¹Hooks, loc., cit.

of a baseball swing has been found to be of some value in predicting hitting success with a correlation of .81 obtained between the scores on this test and the seasons batting averages of high school baseball teams, thus indicating some usefulness.⁶²

In conclusion, it would appear that no one hitting theory or theories can be truly developed, but the implications from this analysis should make great strides in that direction. More important to note is a need for more research in this area, which in the writers opinion hasn't been tapped or explored to the fullest. In the final evaluation, a proper execution of the various movements or mechanics examined here should fulfill the main objective of the swing and will do so with grace and efficiency.

⁶²Charles H. McCloy and Norma D. Young, Tests and Measurements in Health and Physical Education, p. 324.

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AN ANALYSES OF THE HOW'S AND WHY'S
OF OFFENSIVE BASEBALL

by

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The general intention of this investigation was to analyze the various How's and Why's of offensive baseball in order to possibly ascertain or derive from the study some implications toward the establishment of a more scientific approach to the development of the principles in offensive baseball.

Since offensive baseball is centered around hitting, most of the report is centered around hitting. It utilizes information from various related fields and schools of thought. The information for the paper has been gleaned from many different areas including textbooks, periodicals, and articles written by some of the most famous men in baseball and scientific testing.

There is some disagreement on the different theories of offensive baseball especially in the field of hitting. In recent years, experience and research have made many contributions to sports by the offering of new teaching possibilities that no coach or player can afford to neglect. A coach not only needs to tell the How of offensive baseball, but he must inform the young player exactly Why he is doing what he is. It is necessary for a young man to see why he is working for a goal as well as how to accomplish it. The need is great, as evidenced by controversies over offensive baseball theories, for more established guides or teaching principles developed through a scientific understanding of the various offensive skills. The results of such findings can formulate certain theories which may improve baseball programs. These findings can be obtained by using the knowledge of men, who have done research upon the subject of baseball. It was the intention of the report to combine the knowledge of these men into a working floormat for offensive baseball players and coaches.

Even though after reading the report, it would appear that no one hitting theory or theories can truly be developed, to revelationize offensive baseball,

but the implications from this analysis should make great strides in that direction. There should be a great deal more research done in this area in order to help the coaches and players. With proper execution of the various aspects of offensive baseball as presented in this report the young player should be well on his way to becoming a better baseball player and perhaps after many years of constant practice, a member of a professional baseball team.