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One Season is Hardly Over Before the Clubs Begin to Make Plans for the Next. In the Giant Players Limbering Up for Work

Why the System of Batting

The Baseball Magazine Advocates a Drastic Change in the Grossly and Unnecessarily Misleading—How an
comparative Values of Singles,

BY F. C.

REFORM the system of batting averages!" was the slogan of an article in the February BASEBALL MAGAZINE. In that article the gross inaccuracies of the present system were graphically outlined and much needed improvements were suggested. At that time, however, certain essential facts needed to give force to the general criticism were lacking. These essential facts have now been obtained and the lesson they teach forms the theme of the present sketch. Before giving them at length, however, we shall need to revert for a moment to our prior article for a sweeping view of the present situation in baseball circles:

Suppose you asked a close personal friend how much change he had in his pocket and he replied, "Twelve coins," would you think you had learned much about the precise state of his exchequer?

Would a system that placed nickels, dimes, quarters and fifty-cent pieces on the same basis be much of a system whereby to compute a man's financial resources? Anyone who of-

fered such a system would deserve to be examined as to his mental condition. And yet it is precisely such a loose, inaccurate system which obtains in baseball and lies at the root of the most popular branch of baseball statistics.

Fans and figures have a mutual attraction. The real bugs of the diamond like to pour over facts gleaned from the records, to compare Ty Cobb's batting average with Hans Wagner's. Statistics are the most important part of baseball, the one permanent, indestructible heritage of each passing season. And batting records are the particular gem of all collections of figures.

And yet, with all their value and their comparative accuracy, the system which underlies all batting averages is precisely that indicated above. It is a system where dimes are considered equal to half dollars, where the man who has a half-dollar, a quarter, three dimes, four nickels and three pennies lumps them together and instead of saying he has \$1.28 says "Twelve coins." Pretty poor system, isn't it, to govern the most popular department of the most popular of games?

How do batting averages follow this absurd system? Very simply. Batting records as at present conducted give merely the number of safe hits a player makes in comparison to the number of times he had a chance to make a safe hit. For instance, if he were at bat five



**Midst of Winter, Spring Training Days Loom Near. The Illustration Shows a Group of
by a Spirited Sprint Around the Ball Field**

Averages Should be Reformed

Present System of Keeping Batting Averages—The Records
Accurate Analysis of 1,000 Hits Indicates the Com-
Doubles, Triples and Home Runs

LANE

hundred times during a season and made one hundred and fifty hits, he would be credited with a batting average of an even .300. That is to say, he would have hit safely three out of ten times.

The batter who makes twelve hits out of fifty times at bat is given just as much credit as any other who makes twelve hits out of fifty times at bat. But are twelve hits always of the same denomination any more than quarters and dimes and nickels?

One batter, we may say, made twelve singles, three or four of them of the scratchiest possible variety. The other also made twelve hits, but all of them were good ringing drives, clean cut and decisive, three of them were doubles, one a triple, and one a home run. Is the work of the two batters on a parallel? The figures say so. In other words, it is the case of the coins without paying any attention to the denomination.

Now, the sole purpose of batting averages is to give a correct idea of the comparative ability of baseball players with the stick. If these averages mislead or give mistaken ideas of batting ability they forfeit their only excuse in being. There is but one exception. Where records, in spite of errors, are as accurate as possible, they should be accepted as better than none at all. Fielding records, with all their inaccuracies, may be as nearly correct as

circumstances permit. But does the same rule apply to batting? Is there no way to separate the dimes from the nickels and give each its proper value? Let us see.

I took up the matter with Secretary Heydler, who knows more about statistics than any other man actively connected with the game. "I admit," said Mr. Heydler, "that the system of giving as much credit to singles as to home runs is inaccurate to that extent. But it has never seemed practicable to use any other system. How, for instance, are you going to give the comparative values of home runs and singles?"

Mr. Heydler, with his usual clear perception of the facts, went straight to the heart of the matter. For, admitting that you can approximate the comparative values of home runs and singles, you admit that a system much more accurate than the present one might be installed. In short, the batting system of the present has wound its halting way down the history of baseball because the record makers tacitly admitted that there was no way of giving comparative values to the various hits, that there was no way to tell a dime from a nickel.

Now, the *BASEBALL MAGAZINE* is not willing to admit this. And before we are through we believe our readers will agree with us. We do not claim that an absolutely accurate sys-

tem could be devised, but we do believe that one approximately correct, certainly far more nearly correct than the present system, is among the current possibilities.

In the first place, what constitutes the value of a hit? There is but one logical answer. A hit is valuable in so far as it results in a score. The entire aim of a baseball team at bat is to score runs. Hits, stolen bases, taking advantage of errors—in short, all the departments of play—are but details in the process of scoring runs. The one aim of every man on the team is to cross the plate with a tally or to assist some team mate in so doing.

Hits are not made as mere spectacular displays of batting ability; they are made for a purpose, namely, to assist in the all-important labor of scoring runs. Their entire value lies in their value as run producers. Obviously, many hits are made that are for all practical purposes wasted. Games are not uncommon in which one side fails to register a run and yet that side may have made several good hits. On the other hand there are games in which a considerable number of runs are scored, though there were comparatively few hits.

It would be grossly inaccurate to claim that a hit should be rated in value solely upon its direct and immediate effect in producing runs. The only rule to be applied is the average value of a hit in terms of runs produced under average conditions throughout the season.

Obviously, many singles coming when two men are out do not result in a score. Almost every game witnesses a time when a single means a run. The sole method whereby the value of a single may be obtained is to judge of its average value.

We have no figures at hand to show this average value, but we will outline a way whereby that value could be found and even hazard an estimate, doubtless an inaccurate one.

At this stage in the article we were obliged to forsake fact for theory. We had no exact statistics on the comparative values of singles, doubles, triples and home runs, and we were forced to supply conjectural figures which were naturally inaccurate.

Now there are two kinds of knowledge. A person either knows a thing or he knows where it may be found. When we wrote our article last February we didn't know the facts we sought, but we did know where they might be found, namely from observation of a sufficient number of actual contests.

This summer we kept strict account of a large number of major league games. In order that these games might be as representative as possible they extended from the opening contest in April to the closing curtain scene in October and included a world's series game

for good measure. They comprised games played by every club in both major leagues.

From these carefully compiled records we gathered statistics on a thousand hits of all varieties from scratch singles to home runs. A little over sixty-two games were required to supply these statistics. These thousand hits ran pretty true to form. That is to say, they numbered the correct proportion of singles, doubles, triples and home runs. In the case of each hit a record was kept showing how far the man making the hit advanced, whether or not he scored, and also how far he advanced other runners, if any, who were occupying the bases at the time.

And now let us once more emphasize our aim in compiling these laborious statistics.

Our sole object was to find the exact value of a single, a double, a triple and a home run. Hitherto while it had been admitted that these hits were not of equal importance (although the records said they were), and that they varied in importance according to their length, no effort had ever been made to discover their relative value; that is to say the value of a single as compared with a double or a home run. It was this relative value that we sought to glean from our thousand hits. It is these comparative values thus obtained that we now wish to present to our readers.

But before proceeding let us guard against any possible misconception.

The value of a hit lies exclusively in its effect in producing runs. But there is no necessity of having the official scorer at each game laboriously figure out the result of each hit and incorporate such results in the season's batting averages. Such a method, though accurate, would be cumbersome and unwieldy to the point of impossibility. All that is really needed is to discover the average value of singles as compared to the average value of doubles, triples and home runs and incorporate these values when once determined in the official records. In other words, if a single is worth one unit and a home run is three times as valuable, give a player one credit for every single he makes and three for every home run.

Now let us see if our figures will give us these necessary values.

Of the thousand hits which we investigated, 789 were singles. They varied all the way from scratches which a fast runner beat out by an eye lash to hits which were almost but not quite doubles. And what was the value of a single in concrete figures ?

We discovered that a single has three possible values.

First, to the player who makes it. The hit advances him to first base. In other words, he travels one-fourth of his journey to the home plate or one-fourth of a run in terms of bases.

Second, to the player or players already on the bases. The hit advances such base runners even though it does not score them and thus contributes a corresponding fraction of a run.

The first of these values might be considered as the primary value of a single. It never varies. Whatever happens the batter has traveled one-fourth of the journey to home plate. He has annexed one-fourth of a run.

The second value, however, varies widely. There may be no runners on the base paths in which case the value entirely disappears. There may be one runner, there may be two and there may be three. In the latter case generally two of these runners would score. In such a case the secondary value of a single would far outweigh the first, but it is not the province of statistics to examine extremes; it is rather its province to determine general averages. From our statistics we discover that the secondary value of a single, while important, is not quite so great as the first, but of that later.

There is a third value which, while of lesser consideration, must not be ignored. It is this. B makes a single. D comes to bat and drives a grounder to third base. The third baseman gets B at second, but D reaches first in safety. D has not made a single obviously, but he has reached first and reached it through the instrumentality of B. In other words, he is B's representative on the base paths, for if B hadn't been on, D wouldn't have got on either. This situation, which arises from a fielder's choice so called, is one of the results of a single.

SOME INTERESTING FIGURES

Batters' comparative chance of scoring after making—

Singles	23.0%
Doubles	40.1%
Triples	51.6%
Home runs	100.0%

Average number of bases which base runners advanced on each hit:

	Hits	Bases Advanced	Average
Singles	789	603	.85%
Doubles	122	127	1.04%
Triples	60	89	1.48%
Home runs	29	30	1.03%

Comparative chance of driving in runs:

	Hits	Runs Driven in	Average
Singles	789	163	.21%
Doubles	122	47	.38%
Triples	60	38	.63%
Home runs	29	16	.55%

In all such cases we have kept account of the further doings of these deadhead base runners who got on through the temporary death of a former batter and added these results to the sum total. In the case of singles this addition is a fairly important item.

It is from these three sources, and these alone, that the value of a single in terms of runs may be determined.

First, its initial value to the man who makes it.

Second, its value to the man or men who were already on the bases.

Third, its value to the player who reaches first through a fielder's choice at the expense of a batter who had previously singled.

The exact statistics on these comparative values as revealed by 789 singles are as follows:

1. The 789 singles netted the men who made them one base each or 789 bases.
2. They netted runners who were already on the paths 603 bases.
3. They netted runners who reached first on a fielder's choice through the retirement of players who made singles, 154 bases.

In other words, 789 singles resulted in

ANALYSIS OF 789 SINGLES

Of the batters who singled—

789 or 100% reached first base
 457 or 58% reached second base
 283 or 36% reached third base
 182 or 23% scored.

Total bases gained by 789 singles:

On hits 789
 On runners advanced 603
 On fielders' choices 154

789 singles netted 1,546 bases, an average value (allowing 4 bases to one run) of 48.9% of a run.

Runs scored or driven in by 789 singles:

On hits 182 runs
 On runners advanced 163 runs
 On fielders' choices scored 16 runs

789 singles scored or drove in 361 runs, an average of 45.7 % of a run per hit.

A SINGLE IS WORTH:

On total bases netted. .48.97% of a run
 On total runs scored. .45.7% of a run

The latter value is probably the more accurate, and is used as a basis of computation in this article.

a total advance to all batters and base runners concerned of 1,546 bases. Now it requires obviously four bases to equal a run, so the value of a single in terms of runs as revealed from our 789 specimens is found to be 48.9 per cent. In other words, a single is worth a trifle less than 50 per cent. or one-half of a run.

Another and perhaps even more accurate method of determining the value of a single is not in the number of bases it nets the team, but rather in the comparative number of times in which it brings about a score. Let us examine our statistics from this angle.

Our 789 singles carried 789 batters to first base, but unhappily a large number of them remained there; In fact, but 457 of them succeeded in gaining the Keystone sack, while this small army was still further reduced to 283 in making the hazardous journey to third. One hundred and one of these perished miserably at that advanced haven, leaving but 182 who finally rounded Cape Horn and completed the stormy journey home.

Obviously no life insurance company would underwrite a batter's chances of scoring after having made a single. Of the men who make such hits approximately 58 per cent. reach second base, nearly 36 per cent. arrive at third, while but 23 per cent. finally score. The mortality en route is indeed excessive.

Seven hundred and eighty-nine singles make 182 runs. This was the primary, tangible result, but the secondary result was of course in the number of base runners already on the paths who were sent across the rubber by these same 789 singles. Reverting to our dope chest we discover that 163 such base runners were advanced, accelerated or forcibly propelled across home plate by means of these same singles.

And remembering the deadheads who reached first through a fielder's choice at the expense of a batter who had already singled, we find that of this group of parasites, sixteen scored. The number seems small until we remember that there is a reason for it. A player can't reach first on a fielder's choice unless there is at least one man out and very probably more than one, so his chances of reaching home are materially reduced.

The total number of runs scored either by the players who made our 789 singles or through their instrumentality total 361. The comparative value of a single based upon these runs is then 45.7 per cent. of a run. This result which compares very favorably with that obtained from the number of bases advanced may safely be employed as the more exact value of the two. And now for a comparison of singles with extra base hits. At present, according to the ridiculous classification of the batting averages, all are ranked alike. This is gross injustice, but up to date no effort has ever been made to determine the relative value of these hits.

Among the 1,000 hits which we carefully recorded last season, 122 were doubles. Let us examine the value of a double as shown by our figures. Following the system which we just applied to the single we find that the double has a primary importance exactly twice as great as that of the single. In other words, while the single advances the batter who makes it, one base or one-fourth of the distance around the sacks,

ANALYSIS OF 122 DOUBLES

Of the batters who doubled:

122 or 100% reached second base

72 or 59% reached third base

49 or 40% scored.

Total bases gained by 122 doubles:

On hits 244

On runners advanced 127

On fielders' choices 6

122 doubles netted 377 bases, an average value (allowing four bases to a run) of 77.2% of a run per hit.

Runs scored or driven in by 122 doubles:

On hits 49

On runners scored 47

On fielders' choices 0

122 doubles scored or drove in 96 runs, an average of 78.6% of a run per hit.

A DOUBLE IS WORTH

On total bases netted.. 77.2% of a run

On total runs scored. .78.6% of a run

The latter value is probably the more accurate, and is used as a basis of computation in this article.

the double advances him two bases, or one-half the distance to the required haven. The primary value of our 122 doubles then was 244 bases, two for each hit.

The secondary value resulted from the advance made by runners who were already on the bases when the doubles in question were made. From our records we discover that the 122 doubles advanced other runners 127 bases. And just as we discovered in the case of a single, the batter is sometimes retired from the game through the instrumentality of a fielder's choice, while the latter takes his place upon the base lines. Going through our data for doubles we find that such a condition was comparatively rare, only six bases having been obtained by deadhead batters in this way. Adding our three items together we learn that our 122 doubles produced a total of 377 bases which gives each double an average value of a trifle over three bases or 77.2 per cent. of a run.

This might be taken as the comparative value of a double in terms of runs, but

just as in the case of the single it seems better on the whole to determine values rather on the basis of runs actually scored.

Approaching the problem from this angle we discover that not all the players who made doubles reached home safely. To be exact, and that is our aim, of the 122 batters who made doubles, seventy-two or 59 per cent. advanced as far as third, while forty-nine or a trifle over 40 per cent. actually scored. This is a much higher percentage than was the case in singles as we would naturally suppose. The man who makes a two-base hit is in a much more favorable position and therefore much more likely to score than the man who makes a single.

Furthermore, we discover that our 122 doubles in addition to those who finally scored from second base actually drove in forty-seven runs. None of the players who obtained their base through a fielder's choice at the expense of a double reached home, so the combined efficiency of our 122 two-baggers might be rated in terms of the ninety-six runs which they scored in one way and another.

Making the necessary division we find that the value of a double in terms of runs actually scored through its agency is 78.6 per cent. of a run. Notice that the values of both singles and doubles do not vary greatly whether figured according to total bases gained, or total runs scored. But the latter value is on the whole to be preferred.

Every pitcher has a wholesome respect for a three-bagger, and there's a reason. Of our 1,000 hits, sixty were triples. Let us compute the value of a triple just as we have already done in the case of a double and a single.

A triple obviously advances the man who makes it three bases or three-quarters of a run. Our sixty triples, therefore, advanced the batters who made them a total of three times that, or 180 bases.

Furthermore, we discover that runners who were already on the base paths when our sixty triples were made advanced a total of eighty-nine bases. A triple is a good little hit. Like the home run it sweeps clean. Any wreckage on the base paths is swept safely across the rubber when one of those three-cornered wall-ops goes crashing against the fence.

IF IT WERE POSSIBLE TO TELL THE COMPARATIVE VALUE OF HITS THE PRESENT SYSTEM WOULD BE CHANGED

The only excuse for the inaccurate nature of the present batting records seems to be this: The men who compile averages have tacitly admitted that no system exists whereby the comparative values of singles and home runs could be obtained. Were such a system devised, they freely admit that it could be installed with little effort and would furnish a much clearer insight into comparative batting ability of the players than exists at present.

We also discover that a total of seven bases was realized in the form of fielders' choices at the expense of three-base sluggers. Adding these items together, we find that our sixty triples resulted in a net gain of 276 bases. Dividing to find our percentage and allowing four bases to a run, we find that a triple averaged 115 per cent. runs. In other words, a triple was worth a little more than a run to the team which made it.

But just as in the case of singles and doubles we found it better to derive the comparative value of a hit not from the total bases which it advanced the team, but rather through the comparative num-

ber of runs which it scored we must logically apply the same rule to triples.

When a man has made a three-base hit he is almost home, or so it would seem, but our figures reveal the fact that it is a long, long way from third base to the plate. Of the sixty batters who rapped out triples, only thirty-one actually scored. The mortality was indeed distressing. This indicates that where a player makes a triple, he will score 51.6 per cent. of the time. We thought the scoring percentages would be much larger, but our figures prove us a liar. What the triple lacks in scoring punch itself, however, it more than makes up for in the driving power with which it propels the base runners across the welcome rubber. No less than thirty-eight runs were driven home by our sixty triples. Of the seven bases which resulted from fielders' choices at the expense of triples not a solitary run was counted. Adding our totals then we find that sixty triples yielded sixty-nine runs, which gives us a value of 115 per cent. of a run per hit exactly the same as the value obtained from a calculation of total bases.

And now we come to home runs. Of our 1,000 hits twenty-nine were home runs. These twenty-nine circuit smashes obviously netted four times that number of bases or 116.

They furthermore advanced base runners who happened to be fortunate enough to occupy the sacks, a total of thirty bases.

Unlike the single the double and the triple, no batter reached first through the instrumentality of a fielder's choice at the expense of a home run. A home run leaves no opportunity for dead-heading of this kind. It starts and finishes its work without help or hindrance. When

ANALYSIS OF SIXTY TRIPLES

Of the batters who tripled:

60 or 100% reached third base

31 or 32% scored.

Total bases gained by sixty triples:

On hits 180

On runners advanced 89

On fielders' choices 7

60 triples netted 276 bases, an average value (allowing four bases to a run) of 115% of a run per hit.

Runs scored or driven in by 60 triples:

On hits 31

On runners scored 38

On fielders' choices 0

60 triples scored or drove in 67 runs, an average of 115% of a run per hit.

A TRIPLE IS WORTH

On total bases netted. .115% of a run

On total runs scored. . .115% of a run

Both values are the same.

THE BASEBALL MAGAZINE CONTENTS THAT THIS IS POSSIBLE AND OUTLINES WHAT SHOULD BE DONE

The Baseball Magazine contends that the comparative values of singles, doubles, triples and home runs could readily be found by examining the records from a season's games, and once found, these comparative values could thereafter always be used in compiling statistics of batting averages. By employing the system outlined in the accompanying article, a much more accurate light would be thrown on the respective batting ability of the players.

a home run is made, nothing more remains to be said.

Adding our two items then since there is no third item, we discover that our twenty-nine home runs netted a total of 146 bases. Allowing four bases to a run this gives to each hit an average value of 125.8 per cent. of a run. The result is disappointing, as it doesn't greatly exceed that of a triple, but we have already discovered that the better method of determining the value of a hit is rather in the number of runs which scored through its instrumentality than through the number of bases it piled-up for the team which made it.

Examining our records anew we find that there was an impressive amount of scoring where our home runs are concerned, and the reason is readily apparent. We discovered before that a player's chance of scoring after making a single was but twenty-three in one hundred. That his chance of scoring after making a double was about forty in a hundred, and that this chance increased to but fifty-one in one hundred in the case of a triple. The mortality en route to the home plate was very large in every case, declining, however, in proportion to the length of the hit. In the case of a home run this mortality disappears altogether, for, of course, every player who makes a home run scores. Our twenty-nine four-ply wallops then netted the players who made them twenty-nine runs, and they also drove in sixteen additional runs in the persons of players who were upon the base paths.

Our twenty-nine home runs then netted a total of forty-five scores or an average of 155.1 per cent. of a run to each hit.

The information obtained from this analysis is most instructive. Employing the value derived from the comparative number of runs scored from each hit we find that they size up as follows:

A single is worth 45.7 per cent. of a run, a double is worth 78.6 per cent., a triple 115 per cent and a home 155.1 per cent. To be sure, there is a certain amount of duplication in these figures. For instance, each hit receives full credit for scoring players who have reached the bases on other hits which are not specified. But such duplication should not

ANALYSIS OF TWENTY - NINE HOME RUNS

Total bases gained by twenty-nine home runs:

On hits	116 bases
On runners advanced	30 bases
29 home runs netted	146 bases

An average value (allowing four bases to a run) of 125.8% of a run per hit.

Runs scored or driven in by 29 home runs:

On hits	29 runs
On runners scored	16 runs

29 home runs scored or drove in 45 runs, an average of 155.1% of a run per hit.

A HOME RUN IS WORTH

On total bases netted..	125.8% of a run
On total runs scored. .	155.1% of a run

The latter value is probably the more accurate, and is used as a basis of computation in this article.

ANALYSIS OF 1,000 HITS, SHOWING COMPARATIVE VALUES

Singles	789	—Average value	45.7% of a run
Doubles	122	—Average value	78.6% of a run
Triples	60	—Average value	115.0% of a run
Home runs	29	—Average value	155.1% of a run

affect the general result, as it should apply in the long run to one hit quite as much as to another.

Accepting our values as approximately correct and allowing to a home run the most important of all hits, a rating of 100 per cent., we find that singles, doubles and triples rank as follows: Single, 29.4 per cent.; double, 50.6 per cent.; triple, 74.1 per cent.; homer, 100.0 per cent.

But our space is already exhausted. Next month we will continue our present study by noting how the application of

values such as these will alter the season's batting average of certain well-known stars. The present sketch we fear is perhaps a trifle involved—a shade too technical. But we wished to be thorough at all costs; to express our system of obtaining batting values clearly, and if possible, exhaustively. No doubt the system we have followed is open to criticism. But on the whole we feel that our attempt to throw light on problems hitherto unsolved has attained a considerable measure of success.

PRESENT SYSTEM OF BATTING RECORDS GROSSLY MISLEADING

The system of keeping batting averages needs a complete overhauling. At present this system merely gives the comparative number of times a player makes a hit without paying any attention to the importance of that hit. Home runs and scratch singles are all bulked together on the same footing, when everybody knows that one is vastly more important than the other. The result is that the records are grossly misleading. Why not reform them?

In the next number of the **BASEBALL MAGAZINE** we shall discuss the best method of applying the proved values of singles, doubles, triples and home runs to the season's batting averages.

WASTED ENERGY

How many people know that—

The number of foot-pounds expended in hitting singles every afternoon in North America would dig a trench six feet wide and ten feet deep from Mat-teawan, N. Y., to Bromley, Ky.?

The amount of horsepower misspent in hitting foul balls would run enough sewing machines to properly clothe all the heathen in Zamboanga, P. I.?

The units of static force consumed in whacking doubles, triples and home runs would provide propulsive power for sufficient ships to capture enough salt codfish to supply two square meals for all the inmates of our State and Federal penitentiaries?

The amount of earth displaced by the spikes of sliding baserunners would cover Elko County, Nev., with a much-needed top-dressing of cultivatable land five and seven-tenths inches in diameter?

The quantity of language uselessly addressed to umpires would fill four Congressional Records and eleven double libraries of the Encyclopedia Britannica?