

***BETTING
CHEAP
CLAIMERS***

STANFORD WONG

Pi Yee Press

BETTING CHEAP CLAIMERS

by
Stanford Wong
Pi Yee Press

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PREFACE

Betting on horses is fun. You have mountains of information to analyze. You can back your analysis with hard cash. You can compete against other people who are trying to do the same thing you are. You can yell at the horses and jockeys. You have to wait only minutes until the race is over and you learn the correctness of your analysis. You can interact with your opponents, the other bettors, as much as you want before, during, and after the race.

On page 164 of *Betting Thoroughbreds*, Steven Davidowitz says to get ready to bet just one track “takes about thirty to fifty hours of advance work, requires two hours of daily follow-up, and yields approximately one to three good bets a day.” Other expert handicappers probably would agree with Davidowitz on the hours invested. And they probably would agree on the number of worthwhile bets per day. Tom Ainslie, one of the most respected names in handicapping, mentions days when he went to the track intending to bet but ended up making not a single bet all day.

Suppose you don't want to devote thirty to fifty hours to learn all about one track. Suppose you don't want to devote two hours a day to keep up with one track. Suppose what you do want is on occasional visits to Las Vegas to be able to walk into a racebook and find a good bet. If that is what you want, then this book is for you.

This book explains three ways that a casino customer who visits a racebook only occasionally can make money betting on thoroughbred horses. These three things do not require a continuing daily investment of time to keep up with the news of the sport.

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CHAPTER 1

INTRODUCTION

The three ways the occasional racebook customer can profit are competing in handicapping tournaments, betting biases, and betting against horses too good to believe. Each of those topics is covered in its own chapter.

The reason for the title of the book is horses too good to believe are more commonly found in races for cheap claimers.

CHEAP CLAIMERS DEFINED

A claimer is a horse entered in a claiming race. All the horses in a claiming race are for sale for a set price. This claiming price puts a ceiling on the value of horses in the race and promotes uniformity among them. Races with cheap claimers tend to have large fields. Most thoroughbred races are for cheap claimers.

How cheap is cheap? A good rule of thumb is the purse size on maiden special weight races at Golden

Gate Fields. In 1991 those purses generally were \$18,000, and the material in this book worked best on races with claiming prices smaller than \$18,000. Whatever maiden special weight races currently pay at Golden Gate Fields will define the upper limit of cheap. There is no lower limit.

CASINO RACEBOOKS

This book is written from the standpoint of someone who is watching televised races from a casino racebook. There are advantages to watching races at a racebook rather than at a track. Parking is free and so is admission. The seats are padded, comfortable, and free. Casino racebooks generally don't have fancy programs, but they give you the program's essential information on a scratch sheet that is free. You may have to pay for your racing information, or you may get it free. Your drinks are free. Some casino racebooks have adjacent delicatessens that make excellent low-cost sandwiches. You might even be able to get the sandwich free.

The main advantage of watching races at a casino racebook is being able to select from races at several tracks simultaneously. This allows you to be picky about what type of race you examine. You can specialize, betting only certain types of races or certain situations. If a quick look at a race fails to disclose anything of interest, you can turn your attention to a race at another track instead of trying to manufacture a bet where no good one exists.

A casino racebook pays the same odds as the racetrack, with certain exceptions when the racebook is booking bets rather than tying in to the pari-mutuel pool. To protect itself from the possibility of a huge loss on one race, a casino racebook may refuse or limit the

size of a bet on a horse on which it is already overextended. It will limit the odds paid on big bets on long shots. For example, on win bets it is common for a casino racebook to pay full track odds on the first \$100 wagered, but only up to 20:1 on bets over \$100. So if you bet \$200 on a horse that wins and pays \$60 per \$2 bet at the track, the casino racebook might pay you only \$5100 instead of \$6000. Before making a big bet on a long shot, or including long shots in exotic bets such as exactas, check to be sure the possible payoff won't bump into the racebook's ceiling.

Sometimes a casino racebook will pay more than track odds. In Las Vegas: Sahara, Riviera, and Sands occasionally have paid back 110% of track odds.

Casino racebooks offer bets not offered at the track, primarily in-house quinellas.

DAILY RACING NEWSPAPERS

The *Daily Racing Form* has been the most commonly-used daily racing newspaper and is mentioned throughout this book. However, as of 1991, it has formidable competition. *The Racing Times* contains Andy Beyer's speed ratings; they are superior to the speed ratings in *Daily Racing Form*. *The Racing Times* has better trip notes. These are the main reasons why *The Racing Times* is superior to *Daily Racing Form*. If *The Racing Times* survives, *Daily Racing Form* will have to upgrade its information to keep its customers and stay in business.

HANDICAPPING TOURNAMENTS

I first started watching horse races in 1986 when I entered a handicapping tournament with a group of friends. At that time I thought of horses as four-legged random-number generators.

We selected our tournament bets on the basis of what win odds gave us the best chance to win the tournament, which meant picking long shots. Some of my teammates knew how to read the *Daily Racing Form*, but it was useless to me. Copies were given free to all tournament entrants. I spread mine out to give the impression that I was looking at past performances, though in fact I did not need them to select tournament bets.

We didn't win that first tournament. It was fun and we were playing with a big edge, so we entered more. One of my group, Dave Douglas, won a couple of tournaments, so overall we made money on them. Tournament strategy is explained in chapter 2.

SHOW AND PLACE BETS

Tournaments are played with fun-money bets. The first time I bet real money on a horse race was when I saw a horse that appeared to have too little money being bet to show compared to the amount bet to win. I had read William T. Ziemba and Donald B. Hausch's *Beat the Racetrack* earlier, and thought I had a healthy positive expectation betting this horse to show. So my first real-money horse bet was a show bet.

To digress for a paragraph, I'm an investor. I bet my money in situations where if I make similar bets over and over, I will come out ahead in the long run. I have made a living playing blackjack against the casinos of Nevada and elsewhere in the world, and playing in casino-games tournaments such as blackjack and craps. I've written books explaining how to get an edge at blackjack, video poker, pai gow poker, blackjack tournaments, and crap tournaments.

Back to horse races. My friends and I invested time and money making bets following Ziemba and Hausch's advice. Instead of winning at the rate of 20% or so as they said we should, we lost.

One problem was after we got our bets down, last-moment bets by other people would make the situation less attractive. For example, a bet that should have given us a 50% edge would end up with a 10% edge (according to Ziemba and Hausch) at post time. That should have meant winning less money, but we were losing.

The reason we were losing was that our horses were finishing out of the money too often. If the horses we bet had finished in the money as frequently as Ziemba and Hausch said they would, we would have made money using their system.

Page 111 of Ziemba and Hausch's *Betting at the Racetrack* has a table of probability of a horse finishing in the money as a function of odds. For example, the table says 3:2 horses finish in the money 79.3% of the time.

Here is a test of that Ziemba-Hausch table using the entire 1988 meeting for Del Mar. My only reason for using that meeting is I have a complete set of race results. During that meeting there were 195 horses that went off at odds of less than 2:1 in races that had show pools. Of those 195, 54 finished out of the money. According to the Ziemba-Hausch table, the number that should have finished out the money is 34.4. The probability of by chance getting 54 when the expected number is 34.4 is less than a tenth of 1%. So we can reject the hypothesis that horses finish in the money as frequently as the Ziemba-Hausch table says.

After giving up on the Ziemba-Hausch system, I started gathering horse race data on my computer in an effort to improve on their model for show and place bets. I did manage to improve on their model by using different standards for different ranges of odds and for different numbers of horses in the race. This brought me up to the point of being able to break even on show and place bets.

PICK POOLS

Then I discovered pick-nine pools. Hollywood Park and Santa Anita had pick nines that involved paying out a portion of the wagers to whoever picked the most winners, and carrying over a portion of the wagers if nobody hit nine out of nine. The carryover was to be paid to anyone who hit nine of nine, but that seldom happened. It may have been called the pick nine, but seven winners was generally the top effort of the day. On the final day of the season, and at other times if the carryover reached \$2 million, the entire carryover had to be paid out even if nobody correctly picked all nine winners. On mandatory-payout days a huge amount of money was wagered on the pick nine, but payouts exceeded bets by a comfortable margin.

I like situations where total payouts exceed total wagers, so some friends and I got together to exploit the situation. We could not cover every combination of every horse in every race because that would mean buying billions of tickets. We could not cover every likely contender in every race because that would involve buying millions of tickets. We wanted to invest thousands, not millions. But we wanted to spread our money around on enough different combinations of horses so that no matter which horses won we would get

our fair share of the prize money. We were not trying to outhandicap our opponents, we were merely trying to match them. We thought the track would be paying out 50% more than it took in, and we hoped to finish the day with 50% more money than we invested.

Most people who bet large sums in pick pools combine a large number of bets on a relatively few tickets. The weakness of that approach is it involves too much risk; it results in either a bunch of winners or none.

We wanted to spread our money around more to reduce our risk. So we figured out how to spread money over a large number of independent bets. We made few bets per ticket but wrote a large number of tickets. Our average ticket cost \$10. We started by assigning a probability to each horse in each race. We eliminated any horse that did not have at least a 10% chance of winning. Then we asked a computer to generate random bets using the probabilities we assigned. We hired high-school kids to help us copy the computer's output onto thousands of tickets.

Our pick-nine efforts lost money, but they did inspire me to learn what I could about handicapping thoroughbreds.

SIMILARITY TO STOCK MARKET

I soon discovered how to extract a wealth of information from *Daily Racing Form*. And I discovered that handicapping horses resembles investing in common stocks. There are two ways to make money in the stock market, and those same two ways apply to betting on horses. You can make money investing in the stock market if you have information not available to other investors (called inside information), or if you have a superior ability to evaluate public information. You can

make money betting on horses if you have information not available to other bettors, or if you have a superior ability to evaluate public information.

HANDICAPPING

Handicapping involves assigning a probability to a horse's chance of winning. Each horse in the race has a chance to win, though some horses may have very small chances. No horse is a sure thing.

This book assumes that your object is to win in the long run, that you want to find bets that have positive expectations. After you bet on a large number of horses, you want to have more money than you started with; and you want the increase in your bankrolls to be sufficiently large to justify the time invested in the activity.

A common expression is “playing the horses,” as if horses were opponents. It's more realistic to think of your opponents as being the other people betting on the race. You shouldn't be trying to fathom which horse is most likely to win. Instead, you should be looking for those horses that are considerably more likely to win than the other bettors think. Every horse in the race has a probability of winning. You should bet only on a horse whose actual probability of winning is high compared to the probability implied by the odds established by the bettors. Such a horse is called an *overlay*.

The purpose of this book is to explain how to make money betting on thoroughbreds. You can do it in tournaments, you can do it by betting big overlays, and you can do it by betting against big *underlays*, horses that have a considerably smaller chance of winning than the betting crowd seems to think. You can't guarantee that any one particular horse will win, but if you bet suffi-

ciently attractive overlays a large number of times you'll come out ahead.

You must be selective in making horse bets. If you select a large number of horses, you will get a large number of winners and also a large number of losers. You must make only the strongest plays so that your losers don't overwhelm your winners.

FINDING BETS WITH AN EDGE

You should be estimating a horse's chance of winning and comparing that estimate with the odds offered by the tote board. Though most people think of trying to find "the winner," each entrant in a race has a chance to win, and no horse is a sure thing. You should be looking for horses that fall into one of the following categories:

- 1) Large but not obvious overlay
- 2) Large and foolish underlay

Bettors evaluate most horses about right. Because of the track take and breakage, you lose in the long run on any bets you make on horses priced about right.

Large but not obvious overlay. This horse appears to be a huge overlay according to the information you have, but not obviously so. You want a situation where most bettors have overlooked the horse's merits. A small overlay you can't use; you need a huge overlay to at least have the expectation of breaking even because you need to overcome the track take.

The best chance for the occasional racebook customer to find this situation is with bias in the racing strip, as is explained in chapter 4. Most handicapping systems require keeping up with information on a daily basis, and this is difficult for a person who bets horses once every few months. Bias is the exception. A strong

bias overrides all other handicapping factors. Biases come and go quickly; you don't have to keep up with information on a day-to-day basis to make money betting a bias. You do need to recognize a bias and know how to exploit it when you find one.

Large and foolish underlay. This horse is being bet down in accordance with public information that is too good to be true or has nothing to do with the horse's chance of winning the race. If the horse cannot be as good as the tote board says it is, you would like to bet against it. How to find and exploit this situation is covered in chapter 3.

THE REST OF THIS BOOK

Chapter 2 explains how to get a big edge at handicapping tournaments. Chapter 3 explains how to get an edge betting against horses that the other bettors have erroneously made big favorites. Chapter 4 explains how to spot and exploit a bias.

Other chapters include an introduction to handicapping, money management, how to calculate odds, and the track take. There also is a chapter on testing a theory, and one on testing the difference between two totals for statistical significance. At the back of the book is a glossary of terms used in this and other handicapping books.

The material in chapter 3, *Horses To Bet Against*, and some of the material in chapter 5, *Introduction to Handicapping*, apply only to bets on cheap claimers. The other chapters apply to bets on all thoroughbreds.

CHAPTER 2

TOURNAMENTS

In a tournament, the aim is to best your opponents and win the prize. This sometimes calls for a strategy different from orthodox horse playing. You don't expect to win most of the tournaments you enter. As in orthodox horse playing, you hope to win enough when you do win to make a profit overall.

This chapter explains how to get an edge in a handicapping tournament. In most of them you are better off selecting long shots. There is no reason to restrict your tournament bets to cheap claimers.

TOURNAMENT FORMAT

The details of the format differ from tournament to tournament. Typically, tournament entrants are given coupons to make a certain number of tournament bets per day for a certain number of days. Bets are restricted to designated tracks. Win, place, and show bets are

allowed. Exotic bets, such as exactas and daily doubles, are not allowed.

A typical format is four days of betting, choosing from among four tracks, and making nine bets per day. You must bet nine different races each day, but whether you bet nine from one track or spread your bets over multiple tracks does not matter. You bet a fictional \$600 per race, which you can split among win, place, and show bets on one horse. At the end of the four days, whichever contestant has the highest bankroll wins the tournament.

STRATEGY FOR GETTING A BIG EDGE

Suppose the tournament format is four days of nine bets each, for a total of 36 bets. At \$600 per bet, that is a total of \$21,600 in pretend bets. If you know nothing about handicapping, and some magic jinni were to give you \$21,600 with the restriction that you had to bet it all, but you were allowed to keep whatever winning tickets resulted, you'd be best off betting big favorites to show. The reason is, and it's well known, that big favorites tend to be overlays to place and show. That does not mean on average you would cash more than \$21,600 of tickets. It means on average you would end up with less, but closer to \$21,600 than with any other equally naive betting scheme.

How much chance of winning the tournament do you have if you bet big favorites to show? To answer that question, you need to know what final bankroll the winner is likely to have. You have no way of knowing ahead of time what the winning score will be, but you can make a pretty good guess if you know something

about random numbers. Typically there are several hundred people in a tournament. With that many people, chances are at least one person will be very lucky and will have an outcome way way above the average outcome. An average outcome would be turning the \$21,600 into what is left after the track take and breakage, or about \$17,300. For a person betting say 7:1 horses to win, that represents 3.6 winners. Using the Poisson distribution (available in most statistics textbooks), if the average is 3.6 winners, one person out of 244 will have ten or more winners. Ten winners of \$600 bets on 7:1 horses is \$48,000.

Therefore, as a reasonable target, if you want to win the tournament you've got to turn your \$21,600 into around \$50,000.

What are your chances of turning \$21,600 into \$50,000 if you bet favorites to show? Absolutely zero. Even if all 36 of your bets won, you would have less than \$50,000. Same thing if you bet to place instead of to show.

Suppose you made win bets on horses, putting all 36 \$600 bets on the noses of big favorites? No matter how they fared, you'd fall short of winning the tournament! The best handicapper in the world would need all the luck in the world to pick 36 winners out of 36 horses, but that would not be enough to win the tournament if all those horses went off at low odds. If you insist on picking low-odds horses in a tournament, you are donating your entry fee to those of your competitors who are willing to take their chances on longer-odds horses.

How long is appropriate for a tournament? Let's work backward. Suppose you think \$50,000 will win. How might you get to \$50,000? With \$600 as your

betting unit, \$50,000 amounts to 83 betting units. You have 36 bullets in your gun, and after you are done firing you would like to have 83 left. What betting strategy gives you the best chance of turning 36 bullets into 83?

If it has not become obvious already, it will be soon, that you need to put yourself in a position where it is possible to make a big score. Of course you have to get lucky and have enough of your horses win their races, but you also need to win a lot of money when you do win. If you are not required to put some part of each bet on place or show, you shouldn't bet place and you shouldn't bet show. Your chances of a big score are better if you bet it all to win.

For a tournament that has no restriction on maximum odds, your best chance to win the tournament is to do it with a single win. Suppose, for example, that horses of 83:1 and higher odds win with a frequency of $1/200$. What is your chance of hitting at least one winner out of 36 such bets? The average number of winners, which you get by dividing 36 by 200, is .18. You have a small chance of hitting two or more of those extreme long shots. Allowing for that, your chances of hitting one or more extreme long shots in your 36 bets is .165. (For more information on calculating answers to problems like this, look up the Poisson distribution in a statistics textbook.)

Let's pause for a moment and reflect on what this means. Suppose the tournament format is as described above, and there are several hundred entrants. You have about a .165 chance of winning the tournament by picking extreme long shots. For each six times you enter this tournament, you are expected to win once. That is

pretty strong. Your expected prize money is 16.5% of first prize, but your entry fee was only a small fraction of first prize. For example, if the entry fee is \$1,000 and first prize is \$75,000, then on average you will turn your entry fee into more than \$12,000.

If there are several hundred entrants in a tournament, *and* if all of them are poring over their racing newspapers looking for the type of horse they would bet with real money, *and* you have about a .165 chance of winning the tournament by getting lucky and hitting an extreme long shot, then *that* is a tournament you should like to enter.

There is no other category of win odds that gives you a greater chance of winning the tournament than doing it with one horse. Suppose for example you feel more comfortable picking 40:1 long shots because at least for them you can concoct a plausible scenario that allows them to win. Let's make these horses erode bankrolls at a slower rate than what we assumed for 83:1 long shots: Suppose that each 40:1 long shot has 1/60 chance of winning. Your 36 bets on average will have 36/60, or .6 of one winner. The problem is that, from the standpoint of trying to win the tournament, having only one winner is as useless as having no winners. You need to hit two or more 40:1 horses to get a large enough total to win the tournament. A table of the Poisson distribution shows that you have a 55% chance of zero winners and a 33% chance of one winner, leaving 12% chance of two or more winners.

Of course 12% chance of winning the tournament still makes the tournament well worth entering if the entry fee is \$1000 and first prize is \$75,000. But by trying

to hit two horses instead of one, you cut your probability of winning the tournament from .165 to .12.

This example assumed that for non-tournament purposes the extreme long shot is a considerably poorer bet. Nevertheless, winning the tournament with one horse is easier than winning it with two horses. An 83:1 long shot that wins once out of 200 is returning 42% of the money wagered on it, and losing at the rate of 58%. A 40:1 long shot that wins one race out of 60 is returning 68% of the money wagered on it, and losing at the rate of 32%. Even using numbers that made the longer-odds horse look like much more of a sucker bet, it is still the better tournament bet.

This is a general rule for this kind of tournament. If you work out more examples, the pattern continues. Your best chance of winning the tournament is to do it with the fewest possible horses. The more bets you must win, the lower your chance of winning the tournament.

A few sharp tournament entrants discovered this phenomenon some time ago, and won enough tournaments to validate the model. One large tournament was won by a woman who hit nothing for three days and then hit a 100:1 long shot on the final day to capture first prize. That caused some unhappiness among fellow tournament entrants. They complained because they did not like the idea that their tournament was decided by luck instead of by skill, though it appears that the woman who won exhibited more tournament skill than the people who complained about her luck. The upshot was a cap on subsequent tournaments: 20:1 would be the maximum paid on any winning tournament horse.

The 20:1 cap does not change the best strategy to follow: You still ought to try to win the tournament with as few horses as possible.

Let's look at the same tournament format of 36 \$600 bets, and keep the target the same at \$50,000, but put a 20:1 cap on win bets. Turning 36 \$600 bets into \$50,000 is the same thing as turning 36 \$1 bets into \$83.33. You start with 36 units and need to turn it into about 83 units to win the tournament. The fewest winners required to turn 36 units into 83 units is four, which happens with 20:1 long shots. The remainder of this paragraph assumes trying to turn 36 units into 83 or so units, and a 17% track take. Using the Poisson distribution, you have a 5.6% chance of hitting four or more winners at 20:1. If you select 16:1 horses you need five or more winners to win the tournament; your probability of success is 3.4%. If you select 13:1 horses you need six or more firsts to win the tournament; that will happen 2.2% of the time. If you select 11:1 horses you need to hit seven or more to win the tournament; your chance of succeeding is 1.4%.

The score you need to win a tournament is a function of the number of entrants. With more entrants, a larger score is needed. Whatever the number of entrants, you have a better chance to win the tournament if you pick long shots.

Most entrants in handicapping tournaments are reluctant to select horses going off at double-digit odds. As long as this continues, an entrant willing to select long shots has an edge in the tournament whether or not he knows anything about handicapping.

CONSISTENCY TOURNAMENTS

In some tournaments the winner is decided on the basis of various numbers of points awarded for first, second, and third finishers in the race regardless of odds. In such a tournament there might be only two bits of tournament strategy involved. First, you are better off selecting horses with high probabilities of winning—favorites, not long shots. Second, you have a chance to make up ground on a person ahead of you only if you select a horse different from his. In a consistency tournament the edge goes to the good handicapper, not to the tournament expert.

REBET TOURNAMENTS

An interesting tournament format is that made popular by Reno's Cal-Neva. Each entrant buys in with \$500. That amount must be bet on ten different races at the rate of \$50 per race. Win, place, and show bets are allowed, and the money can be split between two horses. The sum of the tickets you cash the first day becomes your bankroll for the second day. Suppose you turn your \$500 into \$560. The second day you again must bet ten races, each with 10% of the bankroll you have at the start of the day. With \$560 you would bet \$56 per race. Someone with \$900 would bet \$90 per race. Someone with \$80 would bet \$8 per race. Your bankroll at the end of the second day becomes your stake for betting ten races on the third day. Your bankroll at the end of the third day becomes your stake for betting ten races on the fourth and final day of the tournament. The highest bankroll at the end of the fourth day wins the tournament.

For this format, handicapping skill probably is more important than tournament skill. The only tournament strategy is to make bets such that you either win the tournament or bust out trying.

Generally the winning bankroll is \$3000 to \$5000. It is nearly impossible to win the tournament if you are making \$12 bets on the final day. Your best chance of winning comes if you have a daily increase in your bankroll.

First three days. A uniform percentage increase to get to \$3000 would be \$500-\$783-\$1225-\$1917-\$3000. A uniform percentage increase to get to \$5000 would be \$500-\$889-\$1581-\$2811-\$5000. You don't need long shots to achieve those numbers; you merely need to get lucky with solid picks.

Suppose not enough of your solid picks win. If you have less than \$600 after the first day, or less than \$1000 after two days, you probably are better off trying to get back on track with a single horse; that means switching over to picking long shots.

Final day. Your best chance to win the tournament is with one winning horse. This is true no matter what your bankroll going into the final day. You'll have feedback on how everyone is doing so you can select a target bankroll. Your target will be subjective because all your opponents must bet their entire bankrolls on the final day.

A note on doing it with one horse: If you have bets left, you can walk up to your target. For example, suppose you have \$2500 to start the final day and have decided to try to turn it into \$5000. You make ten bets of \$250 each. So you look for ten horses at 19:1, right? Wrong. Only your tenth bet would have to be 19:1, and

only if you lost your first nine bets. For your first bet of the day, turning \$250 into \$3000 would be good enough because you still would have \$2250 in your nine remaining bets, which you could bet conservatively to walk your bankroll up to around \$5000.

CHAPTER 3

HORSES TO

BET AGAINST

This chapter discusses horses that are large and foolish underlays. These are horses you would love to bet against. The way you do it is bet on other horses in the race.

Bettors are skillful at setting odds according to the information in racing newspapers. But they do make mistakes. One predictable mistake that bettors occasionally make is to overvalue a horse that is too good to believe. This is not a new concept; it has been referred to in handicapping books for years. These situations come up daily, and occasionally they are so strong that you have an edge betting on every other horse in the race. The races in which you are most likely find huge underlays are cheap claiming races.

What makes a claiming race special is every horse in the race is for sale for a set price. This makes for uniformity among horses entered in the race, especially when the purse is about equal to the claiming price.

HORSES TOO GOOD TO BE TRUE

The main reason for the title of this book is the profitability of searching cheap claiming races for horses to bet against. To describe such a horse, this book uses the acronym *TGTB* to mean *Too Good To Believe* or *Too Good To Be True*.

Here is an example of a TGTB horse. On Sunday, 19 May 1991, all the horses entered in the sixth race at Arlington were for sale for \$5,000. One of those horses, Zuppardo Princess, had a record of performing well, even winning, against horses for sale for \$25,000 and up. By Zuppardo Princess's record, she apparently did not belong in a race with horses for sale for \$5,000. If she were still capable of beating \$25,000 horses, would her owner be offering her for sale for \$5,000 today? Of course not. Yet the bettors at the track, in one of their few predictable instances of stupidity, acted as if she were a \$25,000 horse and likely would win the race with ease. She went off at 3:5 and finished third.

Of course Zuppardo Princess had a good chance to win, but she should have been evaluated at most as a top-notch \$5,000 horse rather than as a \$25,000 horse. There is no way that any cheap claimer should ever be 3:5, or even 4:5.

In betting against a 3:5 horse such as Zuppardo Princess, you should be able to spread \$100 around on the other horses in the race in such a manner that if Zuppardo Princess loses, whichever horse wins will make one of your tickets worth about \$160. Zuppardo

Princess probably had at most a .25 chance of winning the race, leaving .75 minimum total for the other horses in the race. Multiplying that .75 times \$160 gives you what your \$100 investment should turn into on average: \$120.

The important consideration in labeling a horse TGTB is it must appear to *form slaves* to be way too good for the race. (Form slaves are people who believe slavishly in the information available in racing newspapers.)

A TGTB horse looks too good for the race, which is not the same thing as too good compared to the other horses in the race. For example, suppose you are looking at a race with a claiming price of \$25,000 and a purse of \$13,000. One of the entrants last won a \$15,500 allowance race; is that horse too good to be believed? You might think so, since \$15,500 is larger than \$13,000, but you would be mistaken. \$13,000 is not a generous purse for \$25,000 claimers. Some tracks combine claiming prices of \$25,000 with purses of \$22,000. It's as tough to win a claiming race with a \$22,000 purse as an allowance race with a \$15,500 purse. Winning a \$15,500 allowance race does not make a horse too good to be believed when for sale for \$25,000. Such a horse might be a legitimate big favorite as a \$25,000 claimer.

For cheap claimers you should compare the purse of the last race with the claiming price of today's race. If a horse recently won a race with a higher purse than today's claiming price, that horse is a good candidate to be TGTB.

WHERE TO FIND A TGTB

You are more likely to find TGTBs in races in which purse size and claiming price are approximately

equal to each other. At some tracks, races with \$20,000 claiming prices yield occasional TGTBs because they have purses of around \$20,000; other tracks have \$20,000 claiming prices on purses of around \$10,000, and those races are unlikely to yield TGTBs.

If the purse size is half of the claiming price, owners of horses worth the amount of the claiming price can probably race their animals at tracks with better purses. Most of the entrants in a claiming race probably are worth an amount closer to the purse size than to the claiming price. When the claiming price is high in relation to the purse size, a horse that is worth the full amount of the claiming price might be bet down to 4:5 or 3:5 without being an underlay; it might really be a far better horse than its competition.

Purse size is what attracts horses; higher purses attract better horses. Claiming price merely puts a ceiling on the value of the horses in the race. Horses worth considerably more than the claiming price shouldn't be in the race. The value of a cheap race horse is determined by its racing ability. Cheap race horses are worth nothing for breeding purposes. The higher the purse compared to the claiming price, the more race entrants of value approximately equal to the claiming price.

When you identify a horse as TGTB, you want to be confident that the bettors are wrong in thinking that horse is much better than the rest of the field. It helps if you can be confident that at least some of the other horses in the race are worth the claiming price or close to it. When the purse size is as high as the claiming price, the race is likely to attract several horses worth the claiming price. When the purse approximately equals the claiming price, you can feel comfortable betting

against a 3:5 favorite that has recently done well against better horses.

A TGTB horse wrongly appears to be much more valuable than the claiming price of the race. This happens more often in straight claiming races than in maiden claimers. The reason it happens less frequently in maiden claiming races is those races are characterized by a high claiming price in relation to purse size. Seldom is a horse claimed out of a maiden race. Seldom is a maiden worth the claiming price.

The reason for looking for TGTBs in cheap claiming races instead of all claiming races is similar. As claiming prices rise, purses rise too, but not as fast. At high claiming prices, claiming price is high in relation to purse size. Seldom is an entrant in a high-claim-low-purse race worth the claiming price. It is common to find \$30,000 horses entered in a \$50,000 claiming race. The winner of such a race might next pop up in a \$30,000 claiming race and be racing against the same quality of opponent it faced as when it was for sale for \$50,000. In a race with a high claiming price in relation to purse, a horse that goes off at 4:5 probably has the same chance of winning the race as a 4:5 favorite in a non-claiming race: It probably has about a 50-50 chance of winning. This chapter advises betting against 4:5 favorites that have 25% or less chance of winning.

If a TGTB is 4:5 or less, you have an edge betting blindly on all the other horses in the race. Some potential TGTBs are not bet that far down. When you find a horse that you know can't be as good as the bettors seem to think, but it is even money or higher, it is an underlay and you would like to bet against it. But you can't bet against it blindly. You have to find a horse that is an

overlay for some additional reason besides racing against a TGTB.

WINNERS STAYING AT SAME LEVEL

The value of a horse depends on how fast people think it can run, which in turn is influenced by how fast it does run. Running a race can result in reappraisal of a horse's ability, and thus its value. Winning a race can raise the value of a horse, and losing can cause its value to drop.

Sometimes after a win a horse is brought back at the same claiming price, but more often a horse that wins at one claiming price is next raced against more expensive horses. A cheap claimer that wins and then comes back at the same level can be TGTB. If it recently won by a big margin against the same quality of opponents it faces today, or if it has won consecutive races against the same quality of horses it faces today, form slaves may bet it down as if it were too good for today's race.

CAUTION ON OLD HORSES

Be cautious with old horses. The ceiling on racing ability is really a ceiling on value based on the possibility that a horse could be claimed. If a horse is say eight years old, would anyone claim it and hope to get his money back by winning future purses with it? An old claimer might be so superior to its opponents as to be priced correctly when bet down to less than even money.

CAUTION ON BETTING EARLY

You must not bet too early when betting against TGTBs. Not only is there a chance that the TGTB won't

be bet down, but there is an above-normal chance that it will be scratched. If you have a bet on every horse in the race except a TGTB, and the TGTB is scratched, you will end up with a bet on every horse in the race, and whichever ticket you cash won't cover the cost of your bets. Casinos generally will not let you remove bets except in the case of errors discovered before post time. If you have made bets on horses running against a TGTB, and the TGTB is then scratched, you probably will be stuck with those bets.

FINDING TGTBS

A horse worth betting against is the easiest worthwhile handicapping opportunity for the casual racebook patron to spot. You glance at all the TV monitors, looking for horses at less than even money. When you find one, you then see what type of race is being run. If it is claiming or maiden claiming you check further; if it is anything else you pass the race.

If you have found a claiming horse being bet down to 4:5 or less, then you look at a racing newspaper to see if the horse in fact appears to be too good for the race. If you have spotted a situation similar to Zuppardo Princess, you will have an edge on bets you make on the other horses in the race.

FREQUENCY OF TGTBS

In roughly one race out of 100 you will find a TGTB that is so strong that you can blindly bet every other horse in the race against it. That means finding a horse that appears to be way too good for a cheap claiming race being bet down to 4:5 or lower. Of course you will find more TGTBs that are bet down but not as much. If a TGTB is being bet down to 7:5 or lower you might look

at the horses running against it to see if you can find one that appears to be an overlay for some other reason.

OTHER HORSES BET DOWN FOOLISHLY

TGTBs are the most common horses worth betting against blindly. There occasionally are other horses you can identify as large and foolish underlays. An example is the last race of Bill Shoemaker's career, on 3 February 1990. The race was a handicap with a purse of \$100,000, hardly a cheap race. The conditions of the race included "This race will be Bill Shoemaker's final ride. In the event that his mount is withdrawn prior to the running of the race, any one of the remaining entrants' jockeys will be subject to replacement by Bill Shoemaker." There were eleven horses in the race, and Shoemaker's Patchy Groundfog went off the big favorite at 0.7. Undoubtedly many of the people backing Patchy Groundfog were betting only because it was Shoemaker's last ride. The second-favorite went off at 5.7; and the next two favorites, one of which won, went off at 12.4.

If a horse is below even money because of people betting with their hearts and not their heads, bet against it.

TEST

This test looks at a sample of bets on TGTBs to see if they perform significantly worse than other bets. The method of gathering the sample data is straightforward.

Procedure. I have gathered a sample of big favorites in races involving cheap claimers. Those big favorites can be objectively split into three categories: 1)

those whose last race was for a cheaper claiming price or who had lost at the same claiming price, 2) those whose last race was a win at the same claiming price, and 3) those whose last race was for a higher claiming price.

Horses that are climbing from a cheaper price or that did not win at the same price should contain no TGTBs. This test compares that group to horses dropping down from a higher price, some of which are TGTBs and some of which are believable. The null hypothesis is that the climbers and losers at the same level are indistinguishable from the drop-downs. If drop-downs are significantly worse bets than horses that are climbing or have lost at the same level, then the test has established that TGTBs exist.

This test has not required judgment. If a test shows statistical significance without the need for judgment, then the application of judgment can only make the result stronger. Once the test has established that drop downs are significantly worse than climbers and losers at the same level, you should be able to improve the statistical significance by separating drop downs into believable and too good to believe.

Sample. I used big favorites in cheap claiming races at the major California tracks for the period 2 April 1989 to 7 September 1989. The only reason for choosing that time period is I have a complete set of *Daily Racing Forms*, thanks to Howard Stanley Warshaw, except for two weeks in early August. Maiden special weights races at Golden Gate Fields had purses of \$16,000 to \$17,000, so I looked at all races with claiming prices under \$16,000. I looked at both claiming and maiden claiming races. I found 135 cheap claimers that went off

at odds of less than 2:1. The 2:1 cutoff point is arbitrary, and was selected before I began to gather the data.

Analysis. 56 of those cheap claimers won. Using the bet sizes appropriate to bring unit payoffs (as will be explained in chapter 10), the total bets on the 135 horses would have been 57.99. Thus you would have been a small loser had you been able to bet on all the big favorites in cheap claiming races at those tracks during the summer of 1989. You could have made bets such that you needed 57.99 winners to break even, while collecting 56 winners.

62 horses last raced for a lower claiming price or lost for the same claiming price or had never raced. 31 of them won their races. You would have made bets totaling 26.64 units to get those 31 winners, meaning each dollar invested would have turned into \$1.16.

Twelve horses came off wins at the same level. Five of them won, and would have required bets totaling 4.80 units. This sample was not used in the analysis.

There were 61 big favorites whose previous race was at a higher level, of which 20 won. You would have made bets totaling 26.55 units to get those 20 winners. The average dollar wagered would have turned into \$0.75.

The difference between horses moving up and horses moving down is two standard errors away from what might happen due to chance alone. (See chapter 9 for the calculation.) Thus the null hypothesis is rejected. This test demonstrates that TGTBs exist.

Exercise for the reader. Some of the 61 drop-down big favorites were believable and some were not. The pre-race information on all 61 is in table 1 and the race results are in table 2. You can use table 1 to split these

Table 1
Big Favorites Dropping Down

<i>ID</i>	<i>Bet</i>	<i>Today P/CP</i>	<i>Last P/CP</i>	<i>Last Race Result</i>	<i>Age</i>	<i>Expl</i>
1	.62	6.5/12.5	10.5/18	3rd at 6f of mile	4	6f today
2	.40	6.5/12.5	21/45	lost badly	4	
3	.59	13/12.5	22/22.5	4th by 3 1/4	4	bumped
4	.45	13/12.5	15/16	won	4	
5	.42	7/6.25	8/8	close 2nd	6	
6	.45	9/10	17/25	lost badly	3	
7	.50	6.5/12.5	10/20	middle of pack	4	
8	.36	12/10	15/16	lost badly	4	
9	.42	8.5/8	21/A	lost badly	4	turf. Dirt today.
			11/12.5	won		prev race, dirt.
10	.62	7.5/8	10/9	close 2nd	3	
11	.45	11/12.5	13/16	middle of pack	5	leading at 4f
12	.34	11/12.5	20/20	close 3rd	6	
13	.37	11/12.5	15/14	won	7	
14	.38	6.5/6.25	11/12.5	lost badly	4	
			8/8	won		prev race
15	.43	10/10	15/16	4th by 3	4	
16	.40	7/12.5	10.5/18	3rd by 4 1/2	4	
17	.42	7.5/8	13/16	lost badly	3	
18	.50	9.5/10	14/20	middle of pack	3	3 months ago
19	.38	9.5/10	12/12.5	4th by 2 1/2	3	was favorite
20	.34	8.5/8	12/12.5	middle of pack	5	
21	.42	7/6.25	8.5/8	won	4	
22	.43	10/10	39/70	4th by 4 1/2	5	1 year ago
23	.37	7/12.5	10.5/20	poor 4th	3	
24	.36	6.5/6.25	8.5/8	middle of pack	5	
25	.56	6.5/12.5	16/M	lost badly	4	11 months ago
26	.36	6.5/12.5	16/M	lost badly	3	
27	.40	7/6.25	10.5/10	close 3rd	4	
28	.36	7.5/8	13/16	won	3	
29	.34	7/12.5	10.5/18	close 2nd	5	
30	.37	6.5/12.5	10.5/20	middle of pack	3	
31	.45	6.5/12.5	18/32.5	middle of pack	3	
32	.42	8.5/8	11/12.5	middle of pack	6	
33	.48	10/10	11/12.5	4th by 3 1/2	5	was favorite

<i>ID</i>	<i>Bet</i>	<i>Today P/CP</i>	<i>Last P/CP</i>	<i>Last Race Result</i>	<i>Age</i>	<i>Expl</i>
34	.43	6.5/12.5	10.5/20	middle of pack	4	
35	.38	6.5/12.5	13/32	lost badly	3	
36	.53	11/10	12/16	won	7	
37	.42	13/12.5	15/16	3rd by 3	5	3 months ago
38	.38	6.5/6.25	8/8	5th by 3 1/2	4	
39	.34	11/10	14/20	lost badly	5	
40	.42	6.5/12.5	10.5/18	lost badly	5	
41	.37	13/12.5	17/25	middle of pack	4	
42	.56	7/12.5	10.5/20	close 2nd	3	
43	.48	10/10	11/12.5	close 2nd	4	
44	.53	10.5/10	17/22.5	4th by 4	7	
45	.53	6.5/6.25	10/10	won	6	
46	.37	6.5/12.5	10.5/20	close 2nd	4	8 months ago
47	.50	8/8	7/12.5	won by 14	3	
48	.36	7/12.5	17/M	middle of pack	3	2nd by 2 at 4f
49	.56	12/12.5	15/20	close 3rd	10	
50	.43	7.5/8	11/12	6th by 3	3	
51	.36	9/10	13/16	middle of pack	6	was favorite
52	.50	12/10	17/25	lost badly	4	
53	.37	12/12.5	18/27.5	middle of pack	5	
54	.62	12/12.5	14/20	3rd by 3 1/2	4	was favorite
55	.48	11/10	13/16	5th by 3	4	
56	.50	13/12.5	16/20	won	7	
57	.37	7.5/8	10/12.5	7th by 4	3	
58	.37	10/12.5	12/16	lost badly	3	
59	.45	9.5/10	12/16	2nd by 3	3	
60	.40	11/10	21/25	lost badly	5	
61	.38	6/12.5	16/32	lost badly	3	

Key:

Numbers for purses and claiming prices are in thousands of dollars. Expl column applies to last race unless it says “today” or “prev race.”

A means allowance race.

Bet means amount you would have to bet to cash a ticket of one unit if the horse wins.

close means two lengths or less.

M means maiden special weights.

P/CP is purse and claiming price.

horses into believable and TGTB, and then use table 2 to see how poorly TGTBs fared in this sample.

Table 1 contains pertinent pre-race information available in *Daily Racing Form*. Most horses have one line each. Two horses have two lines because I thought you would like to see their last two races. Table 1 has actual purses for past races when I could find them, and otherwise shows a typical purse for that claiming price at that track. Any race with a purse about half the size of the claiming price is a maiden claimer.

The first column is the chronological sequence number of the horse; you need this number to relate table 2 to table 1. The amount you would have to bet to achieve a unit win is shown in the second column. The total of all the numbers in the second column is 26.55. After splitting the 26.55 into believable and TGTB, go to table 2 to see how many winners you have in each category.

Table 2 gives the race results, and enough information about each horse so that you could look up the actual race. All wins count the same: Each win is one unit. (Differences between win odds were taken into account by varying the amount bet on each horse.)

Table 2
Key to Table 1

<i>ID</i>	<i>Bet</i>	<i>Odds</i>	<i>Result</i>	<i>Date & Race</i>	<i>Name</i>
1	.62	0.6		6 Apr 89 2GG	Laddy V.
2	.40	1.5	Won	6 Apr 89 4GG	Turf Raider
3	.59	0.8		7 Apr 89 1SA	Dusty Draw
4	.45	1.2		7 Apr 89 9SA	Go For Broadway
5	.42	1.4		8 Apr 89 4GG	His Royalty
6	.45	1.2		15 Apr 89 6GG	Pia Man
7	.50	1.0		20 Apr 89 2GG	Big Duke Al
8	.36	1.8	Won	21 Apr 89 1SA	Debonair Aidan
9	.42	1.4	Won	21 Apr 89 5GG	Naturally Finicky
10	.62	0.6	Won	26 Apr 89 3GG	Annual Happening
11	.45	1.2	Won	3 May 89 4GG	Pasha's Honor
12	.34	1.9	Won	4 May 89 5Hol	Mrs V.
13	.37	1.7		6 May 89 2GG	Harry Jr.
14	.38	1.6		7 May 89 3GG	Upslope
15	.43	1.3		10 May 89 1Hol	Dr. Leme
16	.40	1.5		11 May 89 1GG	Mingo Doll
17	.42	1.4		12 May 89 1GG	River Time Jazz
18	.50	1.0	Won	12 May 89 3GG	Betagain's Heart
19	.38	1.6		13 May 89 3GG	Dance On Water
20	.34	1.9		14 May 89 9GG	Sharp Ways
21	.42	1.4		17 May 89 7GG	Naturally Finicky
22	.43	1.3		18 May 89 1Hol	Chip of Dreams
23	.37	1.7		18 May 89 3GG	Polar Body
24	.36	1.8		18 May 89 4GG	Raja Lea
25	.56	0.8	Won	19 May 89 1GG	She's One
26	.36	1.8		19 May 89 2GG	Center Ridge
27	.40	1.5		19 May 89 9GG	Wicker Basket
28	.36	1.8	Won	21 May 89 2GG	Reb's Golden Girl
29	.34	1.9		24 May 89 2GG	Funny Funny Bunny
30	.37	1.7		25 May 89 5GG	I'm An Irish Storm
31	.45	1.2		26 May 89 1GG	Vivation
32	.42	1.4	Won	28 May 89 3GG	Wonder Plum
33	.48	1.1		1 June 89 2Hol	Just As Fleet

Betting Cheap Claimers

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<i>ID</i>	<i>Bet</i>	<i>Odds</i>	<i>Result</i>	<i>Date & Race</i>	<i>Name</i>
34	.43	1.3		9 June 89 1GG	Charming Holly
35	.38	1.6	Won	9 June 89 6GG	Zackett
36	.53	0.9		9 June 89 9Hol	Priscilla's Crown
37	.42	1.4		10 June 89 1Hol	Seaweed Salad
38	.38	1.6		10 June 89 4GG	He's My Pleasure
39	.34	1.9		11 June 89 1Hol	Biscayne Boy
40	.42	1.4		14 June 89 1GG	Detained
41	.37	1.7	Won	15 June 89 3Hol	Raw Force
42	.56	0.8	Won	16 June 89 2GG	Lord Underwing
43	.48	1.1		16 June 89 7GG	Dr. Leme
44	.53	0.9	Won	17 June 89 1GG	Sidersell
45	.53	0.9		17 June 89 2GG	Soon To Escape
46	.37	1.7	Won	22 June 89 2GG	Rotodrive
47	.50	1.0		22 June 89 4GG	Lord Underwing
48	.36	1.8		22 June 89 5GG	Highland's Wish
49	.56	0.8	Won	22 June 89 9GG	Caballo
50	.43	1.3	Won	23 June 89 5GG	Cordova Cobra
51	.36	1.8	Won	25 June 89 9GG	King Skipper
52	.50	1.0	Won	30 June 89 1Hol	Lady Charmin
53	.37	1.7		7 July 89 5Hol	Encroach
54	.62	0.6		14 July 89 1Hol	Slide Jet
55	.48	1.1		19 July 89 1Hol	Madcuff
56	.50	1.0		27 July 89 9DM	Ono Gummo
57	.37	1.7	Won	26 Aug 89 4BM	Gorazon Bravo
58	.37	1.7		27 Aug 89 7BM	Pia Man
59	.45	1.2		30 Aug 89 3BM	Fit To Run
60	.40	1.5		2 Sep 89 1DM	Martha's Fastmoney
61	.38	1.6		4 Sep 89 2BM	Sail Away Honey

CHAPTER 4

BIAS

When a horse is more likely to win if it runs on one part of the running surface rather than on another part, the surface is said to have a bias or biased. When a bias is strong, exploiting it is a potent handicapping tool. A bias affects all horses, not just cheap claimers. If the running surface has a bias, how fast a horse runs depends on which route it takes. Most races are won by a few feet—after the horses have run three quarters of a mile or more. A small amount of bias can influence the result if the horses are closely matched. If the bias is strong, the horse in position to best take advantage of it probably is a good bet.

For a good treatment of biases, see Andrew Beyer's books. On page 37 of *The Winning Horseplayer*, Beyer says, "I have often thought that a gambler singlemindedly determined to make money playing the horses would be wise to monitor the results at tracks

around the country, to go wherever he found a strong bias and stay there as long as it lasted.”

Through 1989, biases seemed to be the rule rather than the exception. The question then was: How strong is the bias? Since 1989 the frequency of biases seems to have declined, so that now an unbiased track seems to be the norm.

Biases still occur from time to time. When one pops up it can be very strong. A bias can be so strong as to overwhelm all other handicapping factors. A bias can be so strong that you don't even need to glance at a racing newspaper to find a bet with an edge.

The two most common types of bias are fast rail and slow rail. Beyer calls them “good rail” and “bad rail.” Both yield good bets.

Less common are combinations such as slow rail on the back stretch and fast rail on the home stretch, or slow rail around the turns and fast rail on the stretches. These biases are hard to bet because of the difficulty of predicting which horses will be helped or hurt.

If the weather stays the same and the moisture content of the track stays the same, whatever bias exists in one race holds up for the next race on that same surface. Often whatever bias exists for the first race of the day holds up for the remainder of the day's races on that surface.

If the track is wet, changing moisture content can mean changes in the bias. If a dry track has had a bias and rain starts to fall, the bias may change or disappear. If you find a bias on a wet track but the track is drying between races, any bias you notice during the running of one race may disappear before the next race.

If you find a strong bias, you should watch each race to be sure the bias continues. If a bias that existed in earlier races now seems to have disappeared, it is unlikely to reappear today.

One caution: a bias on one surface is independent of the bias on another other surface. Many tracks run races on two surfaces, one dirt and one turf. Finding a bias on the dirt track does not give any information that can be used in betting turf races, and vice versa.

FAST RAIL

When the rail is fast, inside horses have an edge over outside horses. The inside post sometimes produces a third or more of the winners, the inside third of the horses sometimes produces two-thirds or more of the winners, and any winners from the outside two-thirds of the horses generally are big favorites who won in spite of the bias.

Any track can have a fast rail on a given day. Some tracks have had fast rails day after day. When the air temperature was very cold, Philadelphia has had a very fast rail. Gulfstream often has been fast. After several days of good weather, Bay Meadows tended to have a fast rail.

Example of a fast rail. Table 3 contains the numbers of winners from the inside two posts and the outside two posts on dirt races at Bay Meadows for December of 1988. This information is from *Today's Racing Digest*.

For the month as a whole, inside horses did significantly better than outside horses. Almost twice as many horses won from post 1 as from the outside post. You can reject the hypothesis that the outside horse was as likely to win as the inside horse because these results

Table 3
Dirt Races at Bay Meadows: Dec
1988

<i>Day</i>	<i>Post 1</i>	<i>Post 2</i>	<i>Total</i>	<i>Outside-1</i>	<i>Outside</i>
1-Dec	2	0	9	2	1
2-Dec	0	5	10	0	0
3-Dec	1	1	8	0	2
4-Dec	1	2	8	0	3
7-Dec	3	2	8	0	0
8-Dec	0	0	8	3	1
9-Dec	3	0	10	1	1
10-Dec	2	0	8	0	1
11-Dec	5	0	8	0	0
14-Dec	0	0	7	2	0
15-Dec	3	1	9	1	2
16-Dec	2	3	10	1	0
17-Dec	0	2	8	2	0
18-Dec	1	4	9	0	0
21-Dec	3	0	9	0	0
22-Dec	4	1	9	0	0
23-Dec	2	1	10	2	1
24-Dec	1	0	10	4	1
26-Dec	1	2	10	0	0
28-Dec	1	0	9	0	2
29-Dec	0	2	9	3	2
30-Dec	1	2	10	2	1
31-Dec	2	0	10	0	2
<i>Totals</i>	<i>38</i>	<i>28</i>	<i>206</i>	<i>23</i>	<i>2</i>

are more than two standard errors away from what might occur due to chance alone.

In one three-day stretch, Dec 9-11, post 1 won 10 dirt races out of 26 contested; that leaves only 16 races to be won from all the rest of the posts. Those 10 winners weren't all big favorites either; one was 19:1, another 17:1, and a couple were 9:1.

These descriptions of how the winners ran, from *Daily Racing Form* charts of Bay Meadows races of 10 December 1988, are typical of what you read when the rail was fast: "moved inside on the turn to challenge," "angled inside in midstretch," and "dueled for the lead from the inside from the outset."

From the same source comes these descriptions for big favorites that lost: "lugged out on the turn, came extremely wide for room into the stretch," "moved outside on the second turn, remained out in the drive," and "moved out to launch her bid approaching the quarter pole, remained out into the stretch to challenge."

Signs of a fast rail. When the race starts, the horses taking the early lead are mostly inside horses, rather than the horses that a racing newspaper indicates have early speed. During the race, horses next to the rail seem to run more strongly than horses away from the rail. The field tends to string out and lead changes are few. A horse that takes the lead early and runs close to the rail tends to stay ahead the whole race. In duels on the home stretch, the inside horse runs strongly.

Betting a fast rail. When the rail is fast, the winner of the race tends to be either the inside horse, the horse with the best early speed, or the favorite. Except for the

inside horse, long shots winning by coming from behind are rare when the rail is fast.

Two groups of horses benefit from a fast rail—those starting inside, and those that start quickly enough to get the lead and go to the rail. A great bet is finding that the horse on the inside post has an obvious early-speed edge over the rest of the field. Such a horse is unlikely to go off at long odds.

If the rail is fast enough, the inside horse is a good bet whether or not it has shown early speed in the past.

If the best horse in the race is in the inside post but another horse has more early speed, the inside horse has the edge.

A good rule of thumb when the rail is fast is bet the inside horse or don't bet. Only if the inside horse has no early speed and does not appear to be one of the better horses in the race should you even consider betting on another horse in the race.

If the inside horse is slow enough, the horse next to it can be a good bet. The problem with betting the horse in post 2 is: Sometimes the horse inside of it starts unexpectedly fast, keeping it away from the rail.

If the two best horses in the race are in the two inside posts, you might consider combining them in an exacta or quinella.

SLOW RAIL

Example of a slow rail. This study looks at the 1987 Del Mar dirt races. The meet consisted of 43 racing days, and every day the dirt track was rated fast and the turf was rated firm. There were 9 races per day for a total of 387, of which 317 were on dirt and 70 were on the turf. The 317 dirt races are summarized in table 4 in a similar manner to that used in table 3.

Table 4
Dirt Races at Del Mar: 1987

<i>Day</i>	<i>Post 1</i>	<i>Post 2</i>	<i>Total</i>	<i>Outside-1</i>	<i>Outside</i>
1	1	0	6	1	0
2	1	1	7	2	1
3	2	0	8	0	0
4	1	0	7	1	0
5	0	0	7	1	3
6	1	0	7	1	3
7	0	0	8	0	1
8	1	0	8	1	1
9	0	1	8	2	0
10	1	3	7	0	0
11	1	0	7	1	3
12	0	1	7	2	1
13	0	0	8	1	1
14	0	1	8	2	1
15	0	0	7	1	2
16	0	1	6	2	0
17	0	2	7	1	0
18	0	1	8	1	3
19	0	2	8	1	2
20	0	1	8	0	3
21	1	0	7	0	1
22	1	0	8	0	2
23	2	1	6	2	0
24	1	1	7	0	1
25	3	0	9	2	0
26	2	2	8	1	1
27	1	2	8	1	0
28	2	0.5	7	0.5	3
29	0	0	7	0	2
30	0	2	7	1	0

<i>Day</i>	<i>Post 1</i>	<i>Post 2</i>	<i>Total</i>	<i>Outside-1</i>	<i>Outside</i>
31	2	0	8	0	1
32	0	0	8	0	2
33	1	0	9	1	4
34	2	1	7	0	1
35	1	2	7	0	2
36	0	1	7	2	1
37	0	1	8	0.5	2.5
38	0	1	7	2	0
39	0	1	8	1	2
40	0	0	7	0	3
41	0	1	7	0	1
42	0	1	7	0	1
43	1	0	6	2	0
<i>Totals</i>	<i>29</i>	<i>31.5</i>	<i>317</i>	<i>37</i>	<i>55.5</i>

Notes on split winners:

1. On day 28, one race had three horses and the middle horse won.

2. On day 37 there was a dead heat between the two outside horses.

For the meeting as a whole, outside horses did significantly better than inside horses. 55.5 horses won from the outermost post, compared to 29 from the post 1. You can reject the hypothesis that the inside horse was as likely to win as the outside horse because these results are more than two standard errors away from what might occur due to chance alone.

A bet on all 317 horses on the outside post, with the bet size being whatever was required to yield one unit if the horse won, would have meant betting 47.16 units to win 56.3 units. That amounts to receiving \$1.19 back for each \$1 invested.

There are two reasons why the units won differ from the 55.5 wins. The outside horse in the dead heat went off at odds of 49.6, and it split with a horse going off at odds of 1.4. The bettors on the long shot got 30% of the money split between the two winners, and the bettors on the big favorite got the other 70%. The other reason is some of the outside horses were paired with other horses as entries, and one of those other horses won.

A bet on all 317 horses on the inside post, with the bet size being whatever was required to yield one unit if the horse won, would have meant betting 40.15 units to win 29 units. The average dollar bet on a horse starting from post 1 turned into \$0.72.

Fewer units wagered on inside horses than outside horses means horses starting from the inside post on average went off at longer odds than horses starting from the outside post. This is consistent with bettors being aware of a bias favoring the outside horse and hurting the horse starting next to the rail. Though bet-

tors recognized the existence of a bias, they underestimated its strength.

The difference between 72% of bets returned to horses starting from post 1 and 119% returned to horses starting from the outside post is 2.8 standard errors. Thus you can reject the null hypothesis that the inside horse and outside horse were bets of equal quality. Bets on the outside horse were significantly better than bets on the inside horse.

30 of the outside-post horses went off at odds of less than 2:1. Betting all 30 of them required bets totaling 13.37, and resulted in 11 wins. So betting on the outside horse only if it was a big favorite was a losing strategy. Betting the outside horse only if it was not a big favorite resulted in 287 bets totaling 33.79 units, and produced wins totaling 45.3 units. The average dollar so invested turned into \$1.34, which is 2.5 standard errors above breaking even. It also is 2.1 standard errors better than bets on outside-post horses that went off at odds of less than 2:1. Betting on outside-post horses that were not big favorites was significantly better than betting on outside-post horses that were big favorites.

Here are some other interesting but not statistically significant tidbits about dirt races at the 1987 Del Mar meeting. Bets on the horse next to the outside horse for the 30 races in which the outside horse was a big favorite required bets of 3.86 units and produced 3 wins, so it was a losing strategy.

There were 69 races in which the outside horse went off at 10:1 or more and the horse next to it went off at less than 10:1. Betting all 69 of those next-to-outside horses required 15.20 units, and resulted in 15.7 wins. (The fraction is from the dead heat.)

Of those 69 next-to-outside horses, 9 went off at odds less than 2.0. Betting those 9 required 3.86 units and produced 5.7 wins. That sample is too small to mean anything. It is included here because I thought you might be curious about it. Bets on big favorites lost money on horses starting from the outside post, but made money on horses starting from the post next to it when the outside post was occupied by a long shot.

Signs of a slow rail. At the start of the race: If the outside horses spurt to the front, the rail could be slow.

During the race, if the field bunches up the rail probably is slow. The reason is the jockey in the lead generally takes his horse in toward the rail to run a shorter distance, and there it gets tired and slows down. Horses catching other horses generally run outside of the horse they are trying to pass; and if the outside of the track is faster than the inside path, catching up is easy. A horse that spurts to an early lead and stays ahead of the field the whole way is either a very good horse winning in spite of the slow rail, or has stayed wide the whole way. If two horses are running side by side, the outside horse seems to do better.

When the rail is slow, outside horses seem to be moving faster than inside horses. Unless it is running far from the rail, the leader at the top of the stretch generally won't win the race. Three or more horses seem to have a chance in the stretch. A long shot that looked hopeless on paper seems to have a chance. The finish generally is exciting; the winner often is not decided until the last instant. Of all the horses in contention at the top of the stretch, whichever horse happens to be run farthest outside in the stretch probably wins.

When the rail is slow, favorites seldom win. The outside third of the horses often win half or more of the races. Many races are won by long shots, and these long shots can come from any post position.

Betting a slow rail. The outside horse is the best bet. You want your horse to race wide. If it moves to the rail it will forfeit the advantage of the bias. If the outside horse is likely to get a lead and move to the rail, it is not a good bet. If the outside horse has early speed or if it is so much better than the other horses that it will get the lead easily, you ought to pass the race.

A good rule of thumb when the rail is slow is: If the outside horse is 2:1 or more, bet it; otherwise don't bet.

The jockey probably does not know that his best chance to win is staying wide; he probably is thinking of taking the shortest route between two points.

Some jockeys seem to prefer riding wide. If meeting-long slow rails come back, take notes on jockey riding tendencies to help predict whether an outside horse will stay wide.

CHAPTER 5

INTRODUCTION

TO

HANDICAPPING

This chapter is merely an introduction to handicapping. This author is not a professional handicapper, and does not pretend to be able to turn the reader into one.

Many professional handicappers have written excellent books on this subject. Andy Beyer's books are particularly enjoyable to read. The works of Tom Ainslie, Tom Brohamer, Steven Davidowitz, James Quinn, and William Quirin are highly regarded. Ada Kulleck's *Beat the Track!* is worth reading. *Pace Makes the Race* by Tom Hambleton, Howard Sartin, Michael Pizzola, and Richard Schmidt deserves a place in handicapping libraries.

This is not meant to be an exhaustive list of handicapping books with worthwhile ideas.

Handicapping is using available information to estimate a horse's chance of winning today. Expertise at handicapping allows you to separate the favorites from the long shots. It allows you to determine which horses are priced correctly. It allows you to spot mispriced horses—the long shots that should be favorites and the favorites that, according to the information available, should be long shots.

Much of handicapping involves duplicating the efforts of the other bettors. If you see something about a horse that indicates it should have a good chance of winning today, and if you are looking at a handicapping factor considered by the betting public, then the public should see the same thing you see and should bet the horse accordingly. Much of the material in this chapter falls into this category: It replicates the thought processes of the betting public and helps explain why a horse is priced the way it is.

You can make money betting on horses only if your handicapping allows you to see an indication of a good chance of winning that the betting public doesn't see, or at least doesn't act upon. This is the part of handicapping that is valuable. It is also elusive. Many sharp people are looking for predictable patterns that point to bets with an edge. A new method of finding profitable bets can continue to show a profit as long as its use is confined to a small number of bettors. As its use becomes widespread, the horses it points out are bet down to the break-even point or worse. This book points out a few ways that horses have been mispriced

in the recent past, but there is no guarantee that such mispricing will continue in the future.

Unlikely areas for finding overlays because the information is readily available and easy to interpret are finish in the last race, recency, jockey, earnings, weight, and speed ratings.

FINISH IN LAST RACE

The easiest horses to handicap are those that have run recently in a comparable race. If a horse has recently run the same distance on the same track against the same class of opponents under the same jockey for the same track conditions as today's race, you can look at *beaten lengths* in the last race as an estimate of how the public thinks the horse will do today. A professional handicapper would dig into the details of that last race to possibly come up with a better estimate of how the horse will run today.

The preceding paragraph assumes the horse gave a full effort the whole race. If the horse ran well for most of the race but then "died" in the stretch, you give more weight to the last call he was in contention than to the finish.

Winning its last race might make a horse a favorite today, but it won't make a cheap horse a big favorite. For cheap horses, winning involves luck. Winning may mean its sore knees held together better than its opponents' sore knees.

Running well after a layoff may overexert a cheap horse, with the result that next time out it does not run as well. This is called *bounce* in the literature. For more on bounce, see pages 326-329 of James Quinn's *Recreational Handicapping*.

The fact that most horses last ran a race that differed from today's in one or more ways makes handicapping more challenging.

REGENCY

Having run recently is a good recommendation, particularly for a cheap horse because it must run regularly to pay for its oats. If the last race was for a distance of less than a mile, you would like for it to have been two weeks ago or less. If that last race was for a mile or longer, you would like for it to have been within a month. Those guidelines are rough. The intention is to identify horses that are racing after what seems to be a short enough interval that you can presume the horse is healthy and likely capable of duplicating its most recent performance.

If the horse ran well in its last race but that race was a long time ago, you can't assume the horse will run as well today. If the horse has not raced for a while there must have been a reason. Possibly the horse was simply given a rest, but more likely it was sick or injured. After it recovers it may need a race or two to get back into shape.

Of course every horse in the race has a chance to win. The track veterinarian will not allow a cripple to start.

The word *layoff* means a horse has not raced for a while, and thus does not have a good chance of winning the race. The word *freshen* means a horse has not raced for a while, but was worn out from too much racing and is expected to do better now after getting a much-needed rest. The problem of course is how do you tell a layoff horse from a freshened horse? Perhaps you

won't know until after the race: If the horse wins, it was freshened; if it loses, it had a layoff.

Generally, horses that have not run for a long time are long shots with little chance of winning today. But not always; long-layoff horses do win occasionally. High-class horses and older horses seem better able to give a good performance after a long layoff. Also, according to Barry Meadow and other authors, some horses that were mediocre as two-year-olds but are given time to develop may come back much improved as three-year-olds.

If the horse has not raced recently, the problem handicappers face is lack of information. There is a lack information as to the horse's current form. There may be a lack information as to whether the trainer wants the horse to try to win today or whether the horse is being raced into shape in preparation for a future race. First-time starters, horses that have not run for a long time, and horses recently imported from foreign countries, sometimes are not pushed too hard. Different trainers have different opinions as to how hard such a horse should be pushed.

If a cheap horse has not run for a long time, the reason probably is sickness or injury. In such cases, past performances are of little value in discerning how well the horse is likely to run today. The trainer may have some inkling of how ready the horse is to race today, but everybody else is guessing.

JOCKEY

Bettors who know how to handicap quality horses sometimes get frustrated trying to handicap races with cheap horses because they can't predict today's perfor-

mance from the results of previous races. The trick is to handicap the jockeys as well as the horses.

Jockeys are athletes. As is true of athletes in other sports, there is a wide range of ability among jockeys. The range of abilities among jockeys probably is comparable to the range of abilities among football quarterbacks, baseball pitchers, and basketball centers.

For races involving cheap claimers, differences in abilities among jockeys can be especially important. This is mainly because the claiming price makes for equality among horses. Anyone who analyzes a race involving cheap claimers by looking only at the record of the horse is making a mistake. You must handicap the jockeys too. In a race involving very cheap horses of which one is ridden by an exceptionally capable jockey, that horse should and most likely will be one of the favorites.

The above paragraph applies only to cheap horses. For races involving better horses, differences among jockeys are overshadowed by differences among horses. As Dave Mackett says, "A good jockey can't make a slow horse run faster, but a poor one can make a good horse run slower." Jockey differences are more important in races without fast horses.

The problem with handicapping jockeys is the information is too public. You know who are the best jockeys and who rode each horse on each race in the past performances, but so does everyone else interested in betting the race. Thus jockey information generally won't get an edge.

Dominant jockeys. An athlete can be dominant if he has skill that is huge compared to the athletes he is competing against. In an automobile race involving

approximately equal cars, a dominant driver would be considered the favorite no matter which vehicle he drove. Likewise in a horse race involving approximately equal horses, a dominant jockey should be considered the favorite.

This book uses the masculine form of pronouns for jockeys, but many jockeys are women and a woman certainly can be a dominant jockey, especially if her name is Julie Krone.

Kent Desormeaux started out in Maryland, and was a dominant jockey at Pimlico and Laurel. Russell Baze was a dominant jockey when he rode at Bay Meadows and Golden Gate.

If a jockey who has dominated one circuit moves up to a circuit where the other jockeys are more skillful, he may no longer be dominant. Kent Desormeaux and Russell Baze moved to southern California and found themselves among peers with whom they could compete successfully but whom they could not dominate.

A jockey who has been good but not dominating at one level, and who today is competing against less skillful jockeys, might dominate them.

A dominant jockey repeating on the same cheap horse is not likely to be an overlay for two reasons. First is that bettors will evaluate the horse based on what the dominant jockey did with it. The second reason is that a cheap horse might not have another good race in it. To understand this point, consider the analogy of racing old cars. To have the best chance to win the race, the driver has to push the car to its limit. In pushing it hard enough to win, the driver may have rendered the car incapable of running hard again.

The car analogy also explains why a dominant jockey is a better bet to win than to place or show. If you drive carefully enough to have your best chance of finishing the race, you are unlikely to win. The harder you push the car, the greater your chance of winning and the greater your chance of breaking down before getting to the finish line. A dominant jockey's horses either win or die trying (figuratively).

Apprentice. While the jockey is important in estimating a horse's chance of winning today, knowledge of who is the jockey is less important than who is the trainer to a professional handicapper. The reason is jockey information is well publicized. Past performances list the jockey for each race. Issue of racing newspapers carry tables listing how many mounts each jockey has ridden, as well as how many firsts, seconds, and thirds.

Howard Stanley Warshaw has tracked apprentice jockeys, and says the best ones can be overlays. Perhaps it takes a while for bettors to show proper respect to a new name. An apprentice gets a weight advantage.

EARNINGS

Amount of earnings is an indication of ability, especially if today's race is a route. The longer the distance, the better earnings will predict today's probability of winning. Earnings are a measure of what most handicapping books call *class*. Earnings information is readily available in racing newspapers.

Class is a better indicator of running ability for better horses. With cheap horses you generally can ignore class. As a friend says, "Cheap claimers have no class."

WEIGHT

There is no way carrying extra weight makes a horse run faster. Piling on weight should slow a horse down. Weight is used in an attempt to equalize horses to make a closer race. Information on weight is readily available, and thus weight should be easy for the public to bet correctly.

Because males are generally faster than females, a female racing against males is given a weight advantage. Because older horses generally are faster than two- and three-year-olds, a young horse racing against mature horses is given a weight advantage. Some races take a few pounds off for not having won recently, or for being offered for sale at a lower price. Horses ridden by apprentice jockeys are given a weight advantage, called a *bug*. After racing enough to lose the apprentice bug, jockeys often have difficulty winning. Weight differences seem to make a race closer, but high-weight horses win their share. Weight seldom is a factor in races involving cheap claimers.

SPEED RATINGS

Andy Beyer's speed figures, published in *The Racing Times*, are vastly superior to the figures in *Daily Racing Form*. They are found in the past performances.

Speed ratings enable you to compare horses that raced on different days or at different distances or on different tracks. A higher speed rating means a horse ran a faster race. Comparing speed ratings is more meaningful than comparing elapsed times.

In the past, the speed ratings used by most of the betting public were those available in *Daily Racing Form*. Those speed ratings and the accompanying track vari-

ants had weaknesses. Handicappers who computed their own speed ratings, or who purchased speed ratings other than those in *Daily Racing Form*, were able to get speed ratings superior to those in *Daily Racing Form* and were able to use those superior speed ratings to find overlays. As more bettors use *The Racing Times* to compare speeds of horses, it will be more difficult to find overlays by using superior speed ratings.

TRAINER

Professional handicappers say that the trainer is more important than the jockey. For finding overlays, the trainer should be more important than the jockey because racing newspapers give the name of only the current trainer; they do not list who was the trainer for any past races. Any pertinent information that is not readily available to the betting public is more likely to be useful for finding overlays.

Some trainers have histories of performing better in certain situations, such as with first-time starters. Some trainers will enter horses in races they could win easily if they were to give a full effort, but they may not give the required effort. If a trainer is using today's race as merely a preparation for a bigger race a few weeks or months from now, he may tell the jockey to give the horse a workout but not use him up, to win only if he can win easily. You don't have to worry about trainers playing such games with cheap claimers; with such horses they try to win every time out.

There are many good handicapping books that discuss trainer angles. One example is *Thoroughbred Cycles* by Mark Cramer.

LINEAGE

Some abilities are inherited. The most valuable one for a handicapper to know about is the ability to run on grass. Some sires (fathers) are better than others at producing offspring that can run fast on grass. The appendices of James Quinn's *Recreational Handicapping* lists "Selected Sires Whose Progeny Win on the Turf" and "Selected Sires Whose Progeny Win in the Mud." Racing newspapers list the mother, father, and grandfather on the mother's side for every horse in the race. *The Racing Times* also lists the grandfather on the father's side. Bettors who know which horses are likely to have inherited the characteristics necessary for success in today's race have an advantage over bettors who do not have that knowledge.

In a casino racebook, with races from many tracks, a person could specialize in a certain type of race, rather than handicapping every race on the program at one track. For example, a person could specialize in turf races, ignoring all races run on dirt. Thus knowledge of lineage is potentially more valuable in the racebooks of Nevada than at the track.

SHIPPER

A shipper is a horse that has been transported from another part of the country, more likely by plane or van than by ship. Evaluating shippers is difficult for the casual handicapper, because of lack of information. The speed ratings in *The Racing Times* can be used to compare horses that raced at different tracks, making that publication superior to *Daily Racing Form* for evaluating shippers. Neither newspaper tells you what purses were awarded for claiming races in past performances.

Unless you are familiar with the jockeys at the other track, you don't know anything about the jockey who last rode this horse. The running surface is different at different tracks; for example, some are harder. Some horses handle some surfaces better than others. The lack of widespread dissemination of this information means high potential for finding overlays and underlays among shippers.

A person wanting to become an expert handicapper, and looking for a specialty in which to build expertise, might do well by learning how to evaluate shippers. Blindly betting on all shippers is not a winning strategy. There underlays, overlays, and properly-priced horses among shippers. But there are more underlays and overlays than among horses that the betting public can more easily handicap.

Races that took place in foreign countries are covered in less detail in daily racing newspapers. *The Racing Times* gives purses of foreign races in past performances, making it superior to *Daily Racing Form* for evaluating horses that raced in a foreign country. A person looking for a specialty in which to build expertise at finding overlays might do well by learning how to evaluate horses that last raced in foreign countries.

Bettors sometimes overestimate the probability of a local horse beating a shipper. An example is the 1988 Kentucky Derby. My wife asked if I was going to bet on it, and I said "No." She asked if I had a favorite, and I said "Yes, Winning Colors." She asked why I liked Winning Colors, and I said "Because she will get an early lead. That is important in the Kentucky Derby because there are so many horses in the race that there will be a lot of bumping and some horses will be boxed in." My wife

then suggested you drive up to Del Mar to bet on Winning Colors. I told her if I wanted to bet on Winning Colors, I would do it in Las Vegas. When she asked why, I explained that Winning Colors had California connections; she raced at Santa Anita before shipping to Churchill Downs. Her owner, Gene Klein, was well known in southern California; he formerly owned the San Diego Chargers football team. I expected local bettors to overbet the horse compared to the bettors back in Kentucky. At Del Mar I would have been betting into a pari-mutuel pool of southern California tracks, and would have gotten southern California odds. At Las Vegas my bet would not have been part of a pari-mutuel pool, but rather would have been *booked* and paid at Kentucky odds. I expected better odds on Winning Colors in Kentucky than in southern California. (In 1988, Nevada racebooks only booked bets; none of them were tied into pari-mutuel pools.)

Winning Colors did win the 1988 Kentucky Derby, and *Daily Racing Form* reported the payoffs for the different pari-mutuel pools. For some locations only win prices were reported. Table 5 lists the various payoff prices.

Southern California tied for the worst place to bet Winning Colors; she paid only \$4.40 to win. The farther away from southern California, the better the price on Winning Colors. At Churchill Downs she paid \$8.80, twice as much as in southern California. She paid more to show at Churchill Downs than to win in southern California.

The various winning prices paid on Winning Colors reflect the tendency of local favorites to be underlays and good horses from other parts of the United States to

Table 5

Winning Colors: 1988 Kentucky Derby

<i>Location</i>	<i>Win</i>	<i>Place</i>	<i>Show</i>
Suffolk, Massachusetts	10.60	6.60	5.20
Calder, Florida	10.40	6.00	5.70
Beulah Park, Ohio	10.40	6.00	4.00
New York (Aqueduct)	9.80	6.00	5.20
Thistledown, Ohio	9.80	5.60	4.40
Connecticut	9.60	5.80	5.00
Louisiana Downs	9.60	5.80	4.40
River Downs, Ohio	9.40	5.20	4.40
New York (OTB)	9.20	5.60	4.40
Garden State, New Jersey	8.80	5.60	4.20
Churchill Downs, Kentucky	8.80	5.20	4.60
Rockingham, New Hampshire	8.60	5.60	4.80
Penn National, Pennsylvania	8.40	5.40	4.20
Mountaineer Park, West Virginia	8.20		
Delaware	7.80	4.60	4.00
Fairmount, Illinois	7.60	4.20	4.20
Western Fair, Ontario	7.60		
Fort Erie, Ontario	7.50		
Pimlico, Maryland	7.40	5.60	4.00
Detroit, Michigan	7.40	5.20	4.00
Blue Ribbon Downs, Oklahoma	7.40		
Verendrye Ben, South Dakota	7.20		
Sportsmans, Illinois	7.00	5.00	4.60
Charles Town, West Virginia	7.00	4.40	4.00
Woodbine, Ontario	6.90	4.80	3.80
Stampede Park, Alberta	6.70		
San Juan Downs, New Mexico	6.60		
Exhibition Park, British Columbia	6.40		
Canterbury Downs, Minnesota	6.00	4.80	4.00
Playfair, Washington	6.00		
Connaught Harness, Quebec	5.90		
Last Chance, Montana	5.80		
Sunland, New Mexico	5.80		
Saskatchewan	5.80		
Northlands Park, Alberta	5.70		
Assiniboia Downs, Manitoba	5.60		
Louisiana	5.50		
Blue Bonnet Harness, Quebec	5.50		
Tri-State, West Virginia	5.40		
Turf Paradise, Arizona	5.40		
Yakima, Washington	5.40		
Santa Fe Downs, New Mexico	5.20		
Northern California	5.20	4.00	3.60
Les Bois, Idaho	4.60		
Multnomah Club, Oregon	4.60		
Longacres, Washington	4.40		
Southern California	4.40	3.80	3.40

be overlays. The highest prices were paid in parts of the United States far away from southern California. The various Canadian tracks that took bets on Winning Colors priced her fairly low, but not so low as southern California.

Winning Colors was not a cheap horse, but cheap horses are as likely to be misbet as Winning Colors.

There are possibilities for arbitrage here. A person could have bet all the horses except Winning Colors in southern California while a friend bet on Winning Colors on the East Coast, assuring a profit no matter which horse won the race. The 1990 Kentucky Derby, featuring (but not won by) the Puerto Rican horse Mister Frisky, also presented an attractive arbitrage opportunity for anyone able to make bets in Puerto Rico.

MEDICATION

Some horses bleed due to ruptured blood vessels during a race or hard workout. Such horses are called *bleeders*. Some states allow a bleeder to receive medication to control the condition. One common medication is called furosemide or Lasix. A horse racing with such a medication sometimes performs better than if it were not taking the medication. The difference is most pronounced on horses taking the medication for the first time. A previously unmedicated horse that started well last race and then died, and is on Lasix for the first time, should be better able to go the distance today.

CONFIGURATION OF THE TRACK

If the start of a race is close to a turn, the outside horses are at a disadvantage in that they will likely be forced to run wide the first turn.

How much does this cost? The extra distance a horse must run if it is additional horse-width from the rail is about one length. This is because the circumference of a circle is 2 times pi times the radius, so the extra distance around a half circle is pi times the radius. The distance around one curve of a racetrack increases by pi times how far away from the rail the horse runs. Pi times the width of a path approximately equals the length of a horse. Example: A horse that is forced to run in the four-path around a turn has to race three lengths farther than a horse that stayed in the one-path.

OPPONENTS IN LAST RACE

If the horse last ran against better horses, or inferior horses, you must take that fact into account in coming up with today's probability of winning. The material in this section is an approximation of the crowd's assessment; a professional handicapper would use a more sophisticated approach.

Purse size is the best indication of quality of horses that contested a race. For example, \$10,000 purses are offered for \$10,000 claiming races at Hollywood Park and also for \$12,500 claiming races at Solano. Therefore, a horse that last raced as a \$10,000 claimer at Hollywood Park probably faced similar opposition as a horse that last raced as a \$12,500 claimer at Solano. A \$10,000 claiming race at Solano carries a purse of \$9,000.

Solano offers restricted claimers such as "for \$12,500 claimers who are non-winners of 2 races lifetime." These attract inferior animals compared to races without such restrictions. *The Racing Times* reports such conditions in its past performances, but *Daily Racing Form* does not.

For a given purse size, races restricted to horses bred in a particular state generally are inferior to races

with no such restriction. The amount by which they are inferior varies from state to state. According to page 74 of Brohamer's *Modern Pace Handicapping*, "With the exception of California, Kentucky, and possibly Florida, races restricted to state-bred horses are uniformly inferior."

Last race against cheaper. A horse that won its last race, if against slightly cheaper horses, should be among the favorites today. A horse that fared well against cheaper horses in its last race, but did not win, may not do as well today when it faces tougher opponents. A horse that did poorly against cheaper horses last time out should be a long shot today.

Last race against better. A horse that faced considerably more expensive horses in its last race is suspect today; there must be something wrong with it to bring it down to this level. Chapter 3, *Horses to Bet Against*, delves further into this. Horses that last raced against slightly better than they face today, but without winning, should fare better today since the competition is easier.

Sex. For a given purse, males run faster than females. This means a female that has competed successfully against females at a certain class will have difficulty competing against males of slightly lower class. Females that have been competing successfully against males of a certain class will be competitive against females of a slightly higher class.

DISTANCE & FOOTING

If the last race was a different distance or on a different surface (dirt versus turf) or different track conditions (e.g., muddy), you can look at the horse's earlier races to find one more like today's race.

TRACK CONDITION

If today's track is muddy or sloppy, those horses that can't handle an *off track* (perhaps because of small feet) can be expected to fare poorly. A *mudder*, a horse that has proven its ability to run well in mud or slop, will not be slowed by the off track. Sometimes the ability to perform well on an off track is indicated by a *mud mark* in *Daily Racing Form*.

In the mud, a horse with a lead is likely to keep it. Many authors have written that horses do not like to get anything kicked in their faces, and thus are reluctant to pass in the mud. An alternative explanation is that a horse that can handle the surface simply runs faster the whole race.

PACE

Pace handicapping deserves a whole book, not just a section of a chapter. I recommend Tom Brohamer's *Modern Pace Handicapping*. The most respected name in pace handicapping is *Howard Sartin*. A chapter in Brohamer's book discusses the Sartin methodology. Another book that discusses the Sartin methodology is *Pace Makes the Race* by Tom Hambleton, Howard Sartin, Michael Pizzola, and Richard Schmidt.

Pace handicapping involves several things. It involves analyzing past races to see what sort of runners have been winning—those that have early speed, those that press close behind the early speed, and so forth. It involved analyzing the horses entered in a race to try to figure out how the race will be run—which horse is likely to take the lead and when. The object is to find the horse or horses that best fit the profile of what it takes to win on this track.

Part of the Sartin methodology is to convert times to velocities. This is more than just an exercise in arithmetic. A basic formula from high school physics is kinetic energy equals $1/2$ times mass times velocity squared. Racing newspapers give times for quarter-mile increments of a race. Taking reciprocals to convert those times to velocities gives a relative measure of the energy a horse expended during a race. Two horses might have run 1:10 for six furlongs under identical track conditions, but one of those horses might have run a much more impressive 1:10.

Consider two human runners, high school milers. Both of them recently ran a mile in 5:00. Is one of them a better runner than the other? You can use their quarter-mile splits to answer that question. Suppose the first runner's splits were 65-75-80-80, and the other ran 70-75-76-79. Both runners could break five minutes if they would run more even splits, but which runner has more potential for improvement in final time? The first runner. You can demonstrate that with a velocity calculation. In feet per second, the velocities of the first runner were 20.3, 17.6, 16.5, and 16.5. Energy expended is proportional to the sum of the velocities. (Energy is $1/2$ times mass times the square of velocities for time intervals of 65, 75, 80, and 80 seconds, which simplifies to $1/8$ times mass times average velocity times the sum of the velocities for quarter-mile distances.)

For the first runner, the sum of the velocities is 70.9. If that runner would use energy at a constant rate for the whole race, he or she could run 17.725 feet per second, which would mean a 4:57.9 mile.

For the second runner, the velocities are 18.9, 17.6, 17.4, and 16.7 feet per second. The sum of those is 70.6.

If that runner would use energy at a constant rate for the whole race, he or she could run 17.65 feet per second, or 4:59.2 for the mile.

This is a book about equine runners, not human runners, but the same principle applies. Thoroughbreds start fast and decelerate during the race. Higher velocity for the first part of the race than for the last part means a horse is using energy at a decreasing rate during a race. When comparing horses that ran the same final time, it also means that starting extra fast indicates more energy than closing extra fast.

Take for example two horses that each ran six furlongs in 1:10.0 under identical track conditions. Suppose the fractions for the first horse were 22.2 and 45.0, and the fractions for the second horse were 22.6 and 46.0. The velocities in feet per second of the first horse were 59.5, 57.9, and 52.8, for a total of 170.2. The velocities of the second horse were 58.4, 56.4, and 55.0, for a total of 169.8. Even though both horses ran the same final time of 1:10, the first horse demonstrated more energy, 170.2 to 169.8. Recognition of the weight loss due to sweat during the race would magnify this difference.

If the horse that ran 22.2, 45.0, 1:10.0 could be forced to use its energy at an even rate for the whole six furlongs, it could run 56.73 feet per second, which would give a final time of 1:09.8. That calculation ignores the reality of having to run wide to pass other horses. Since running wide on a turn to pass other horses probably would cost more than a length, starting fast probably yields a better final time than maintaining an even pace. Thus for horses, starting fast and decelerating is the smart way to race.

There is more to pace handicapping than figuring out which horse has displayed more energy. A pace handicapper tries to determine each contender's pattern of using energy, and find the horse that uses energy in the manner best suited to winning today. A pace handicapper tries to figure out whether one horse has enough early speed to get a clear lead, or if it will be involved in a speed duel with another horse. A pace handicapper tries to determine what energy distribution the racing strip favors (also called a running-style bias), and then which horse or horses seem to run with that energy distribution.

Pace handicapping has the potential to win money because it uses information in a manner that is not obvious to the betting public.

Early speed. If a horse has *early speed*, and is able to get an uncontested early lead today, it may be able to lead from wire to wire. This is particularly true if it starts inside, and if other front-runners in earlier races today have been able to hold on and win. Bettors at the track know this, and should price a horse accordingly if it is the only entrant with early speed.

How do you identify early speed? Check the past performances. If a horse has consistently been in the lead at the first call, it is said to possess early speed.

Early speed is a relative thing. A horse that has consistently been in the top three at the first call might be considered to have early speed for this race if it is facing all slow starters today.

Speed duel. For a thoroughbred, running side by side with another horse is tougher than running alone. Perhaps a horse uses its energy more efficiently while running alone. Perhaps a horse tightens its muscles

when shoulder to shoulder with another horse, using energy faster without running faster. Whatever the reason, a horse running relatively alone has an advantage over a horse running side by side with another horse. A speed duel is when two or more horses run side by side in the lead, and the effort seems to tire both of them.

Winning after being involved in a speed duel for much of the race is impressive.

If there are two or more horses in the race with comparable early speed: It is possible that one horse will win wire to wire; but it is more likely that a speed duel will exhaust the early-speed horses, and the winner will be a horse that comes charging from behind in the stretch. Thus only a lone early-speed horse is a threat to win wire to wire.

A horse that runs right behind the early-speed horses is said to be *stalking* them, and to be running in the *garden spot*.

Wire to wire winner. If a horse won its last race by getting an early lead and leading the whole way without another horse ever getting within a length, it won easily. Winning wire to wire with a comfortable lead is easier than winning while running next to other horses. Winning wire to wire means a horse probably ran faster than it would have run had there been shoulder-to-shoulder competition.

TRIP HANDICAPPING

Perhaps a horse had a *tough trip*. The most common tough trip is a horse encountering *trouble* during a race. Running against a bias is also a tough trip. The number of beaten lengths at the finish of the race may understate the running ability of a horse that had a tough trip.

There is more public information about trouble than what you see in the past performances in *Daily Racing Form*. Each race is written up in a *chart* that appears in *Daily Racing Form* a couple of days after the race. The chart of a race gives more information about trouble encountered by a horse than does the line in today's past performances. Handicappers who have access to the chart are better able to judge the trouble than those who have access only to *Daily Racing Form's* past performances.

Some people watched that race closely, knew what they were watching, and took notes on what they saw. Those people should be better able to evaluate the trouble than anyone who has only the charts. This is particularly true for televised races, because one can watch several replays. A casino racebook shows the same replays as are shown at the track.

Some trouble is self-caused, and some is caused by other horses. Self-caused trouble is likely to repeat. Trouble caused by other horses leads to the best betting situations. Examples of self-caused trouble: breaking awkwardly, lugging in or out, and hopping in the air. Examples of trouble caused by other horses: being bumped, being jostled, being impeded, being boxed in, and steadying in tight quarters. "Battled" means the horse ran shoulder to shoulder with an opponent for a long while, and thus had a tough trip.

Trip handicapping means watching races carefully and taking notes on which horses had unusually easy or difficult trips. Next time those horses run, the trip handicapper might have information not available to the betting public. If he does have such information, he should find that a horse coming off a particularly

easy trip is an underlay, and a horse coming off a particularly difficult trip is an overlay.

A good explanation of trip handicapping is Steven Davidowitz's *Betting Thoroughbreds*. Davidowitz suggests keeping the charts of race results that are published in *Daily Racing Form*, and using them to supplement past performances. The reason is that some of the information in the charts is not carried over to the past performances, particularly the paragraph describing the action.

Test: California, April-July 1989. For this study I collected the weekly "Chart Recap Editions" of *Daily Racing Form*. "Chart Recap Editions" generally appear in the Monday edition of the *Form* and contain charts for a week of whatever thoroughbred races are running at Santa Anita, Hollywood Park, Del Mar, Bay Meadows, and Golden Gate; such editions do not seem to be available for races run elsewhere. "Chart Recap Editions" are a convenient way of acquiring and maintaining a collection of race charts.

After acquiring the latest "Chart Recap Edition," I read through each race description and underlined in red those horses that seemed to do well in spite of having a tough trip. I did not underline a horse simply because it had trouble; it had to appear to have run well in addition to having trouble or being involved in a gruelling speed duel. About 40% of the horses I underlined were race winners; second-placers were next most common, and so on down. I kept an alphabetical list of horses that I identified as running well in spite of having tough trips.

When a horse ran again, I kept track of how it did, using the bet size appropriate to yield a unit amount if

the horse won. I used that next race no matter what the past performance said about the tough trip. Sometimes the past performance did right by the trip, and sometimes it understated the toughness of the trip. Here are two examples.

The sixth race at Golden Gate Fields on 26 May 1989 had a purse of \$8000 and was for \$8000 claimers. The winner was *Soon To Escape*. The chart in *Daily Racing Form* said, “SOON TO ESCAPE dueled with BLEDSOE for the lead to the stretch, edged clear in midstretch and was hard ridden to hold MELCHIP safe.” That description makes it sound as if *Soon To Escape* survived tough duels with two other horses. He next raced at a \$10,000 claimer in the seventh race on 4 June 1991. His past performances gave no hint that the 26 May race was a tough trip. He won again, as the third favorite, and paid \$11.00.

Here is the other example. The third race at Golden Gate Fields on 29 May 1989 was a mile and a sixteen on turf. The purse was \$20,000, and the claiming price was \$32,000. *Wily Sham* was a badly-beaten fifth out of six horses. The chart said “WILY SHAM took a short lead early while a bit rank, dueled for the lead to upper stretch, was steadied sharply to avoid QUICKSTITCH and gave way readily in the final furlong.” *Wily Sham* next raced on 14 June 1989, and his past performances said nothing about any trouble in the 29 May race. The 14 June race was six furlongs on dirt, for a price of \$19,000 and a claiming price of \$32,000. With the change in distance and surface, the bettors shouldn't have placed much weight on the 29 May race. *Wily Sham* finished seventh out of seven, at odds of 21:1. I mention him here because his “dueled for the lead” and “stead-

ied sharply” in the chart earned not a mention in his past performances.

I kept track of these tough-trip horses for the rest of the Hollywood Park and Golden Gate Fields meetings. The results are shown in table 6.

As table 6 shows, horses with tough trips were slight losers at Hollywood Park and winners Golden Gate. These results represent 70 tough-trippers running again at Hollywood and 29 at Golden Gate. The standard error applicable to the 20.59 wins needed to break even is 3.6. The actual number of wins are higher than the break-even number of wins, but by an amount too small to be statistically significant.

Though they don’t prove anything, these results are consistent with charts having more information than past performances, and bettors relying on past performances because that is all that is available in the issue of *Daily Racing Form* for sale on the day of the race.

The standard error applicable to the Golden Gate results is 1.9, so the nine winners at that track were 1.8 standard errors greater than breaking even. That falls short of statistical significance. Even if the number were greater than 2.0 it would be suspect; you should avoid the temptation of trying to find significance in a subset

Table 6
Next Race After Having a Tough Trip

<i>Track</i>	<i>B-E Wins</i>	<i>Actual Wins</i>
Hollywood Park	15.04	13
Golden Gate	5.54	9
Total	20.59	22

of the data. You can do that only if you have some logical reason to partition your data into subsets.

There may be handicapping factors that find overlays at Golden Gate Fields but not at southern California tracks. There is a tremendous amount of quality handicapping information available for southern California tracks. The fact that a horse had a difficult trip in its last race is unlikely to be missed by people betting big money on horses running in southern California. Golden Gate has smaller crowds betting fewer dollars, and thus is less able to support the information-supplying industry. If the line in the past performances inadequately described the difficulties a horse had in its last race, that horse might have been a good bet.

The trip notes in *The Racing Times* are superior to those in *Daily Racing Form*. Thus it may no longer be possible to find overlays by finding tough-trip information in charts that is not reported in past performances.

PUTTING IT ALL TOGETHER

Many factors have predictive value in estimating how likely a horse is to win a race. Many bright people have invested much time building sophisticated models to predict how a race will be run. In general, the win prices established by the bettors at the track are good estimates of how likely the horses are to win the race. The track take is large, so you need to find big mistakes being made by the other bettors to be able to profit from the bets you make.

An expert handicapper can go to a racetrack, study every horse in every race, come up with an estimate of probability for each horse winning, and look for big overlays to bet. With so many tracks to look at, a casino racebook customer is better off zeroing on the races that

seem to offer the most potential for an overlay. Most of your effort is wasted when you figure out the odds for every horse. Zeroing in on the best races minimizes this wasted effort. The casual racebook patron can look for biases and horses too good to believe. The person who wants to invest the time to find good bets on a more regular basis can specialize in shippers or foreign horses or turf horses or trainers or pace handicapping or trip handicapping or something else.

The basic model. It is helpful to think of a model in which each horse has a probability of winning, and all the horses in the race have probabilities that sum to one. A bet on a horse has a positive expected value if the probability of the horse winning times the payoff exceeds the cost of the ticket. You're looking for horses that exceed that minimum by enough to allow for the possibility of errors and to compensate for the risk involved in making the bet.

You don't necessarily bet on the best horse. For example, suppose you think a horse has a 50% chance of winning the race, but it is being bet down to 4:5. You shouldn't bet on it. If you were to bet on a large number of 4:5 horses and win half of those bets, you would lose money.

But suppose a horse you think has a 50% chance of winning is 3:1 on the tote board. This horse appears to be a big overlay. Anything better than even money is profit on a horse that wins 50% of the time. Should you bet on it? If you know for certain that the horse has a 50% chance of winning, you should bet on it. But you can never be certain of probability of winning. You always have to work with estimates. Before making a bet on what you think is a big overlay, you ought to recheck

your information to be sure you have not missed something important. For example, if the horse has not run for thirteen months, you may have missed the fact that the layoff was longer than one month.

You don't bet on a horse because you think it is going to win for certain. Rather, you bet on a horse if its chance of winning is high enough that if this race were run over and over again a large number of times the payoffs would greatly exceed the bets.

To the casual handicapper, there are only two horse situations worth betting. You can bet on a horse that is a big overlay but not obviously so, where the reason you like the horse is likely to be missed by the betting public. And you can bet any or every contender against a horse that is too good to believe, if the TGTB is 4:5 or less. If a bet does not fit into one of these two categories, A casual handicapper probably should not make it.

Of course a race can fit into a combination of the two categories. If you find a horse that is a foolish underlay but is not being bet down to 4:5 or less, you can look closely at its opponents to see if one of them is enough of an overlay to justify a bet.

When you look at odds on the tote board, you are looking at how win bets will do. There is also the possibility of finding a worthwhile bet to place or to show, or an exacta or daily double. For information on evaluating these opportunities, see Barry Meadow's *Money Secrets at the Racetrack*.

Even when you see a horse that you think is a big overlay, you must monitor the tote board to be sure the odds are high enough to justify a bet. You should wait

to make the bet until you are confident the odds will stay high enough.

One way to come up with probabilities of winning is to first reduce each horse's chance to a number of beaten lengths. Each three beaten lengths mean half the probability of winning. Thus if you project one horse to be one length ahead of another, the ratio of their probabilities of winning should be about 1 to 0.8, which is the same thing as 1.25 to 1.

No horse is a sure winner. Repeat—no horse is a sure winner. You shouldn't try to pick *the* winner. If you keep track of imaginary bets on horses you think can't lose, you will find that so many of them do lose that you would have lost money betting on them. Every horse in the race has a chance to win, though the chance might be tiny for some horses.

Keeping written records. You should keep careful records of how your bets do. You should also keep track of how the horses do that you thought seriously about betting but didn't. Review of these records can tell you what things made money and what things cost you money.

Keeping written records is important because otherwise you tend to remember the winners you have selected and forget about the losers. Your brain does that to you. You tend to remember happy things and forget sad things. This is good because it helps your disposition, but bad because it distorts your perceptions of how well you have done with your bets. Only from written records of bets selected before a race was run will you get an accurate account of the losers you have selected.

For any category of horses you want to track, “sure winners” or whatever, it’s important to write down your selections before the race is run. It also is important to be pure about it—do not make any post-race adjustment, either adding horses to the sample or removing horses from it.

A benefit of keeping track on paper of bets you almost make is to give additional feedback on whether you are handicapping well enough to make money. The horses you bet should show a profit, and the horses you almost bet but pass up because they are marginal should approximately break even. If the horses you almost bet turn out to be big losers on average, then you are betting some horses you should be passing up.

Investing your time. The only way you can make money betting on horses is to find horses that other bettors misvalue. That is, you make money when other bettors make big mistakes. But finding big mistakes made by other bettors is not easy.

Your time is better spent looking directly for potential overlays and underlays. You’d like to find a situation in which horses are frequently and predictably misbet. There are a few such patterns. If you don’t see any hope of finding a mispriced horse—no bias, no potential TGTB, no shippers, etc.—then you probably would be wasting your time handicapping that race.

Every once in a while you will find an outstanding bet, a horse for which you would push little old ladies out of the way to make your bet. Upon reviewing your records of past bets you will discover that if you had restricted your bets to those outstanding opportunities, you’d be way ahead of the game.

There is a similar tactic used by other gaming professionals. A professional blackjack player does not sit down at the first available table and play every hand; it's more profitable to walk around and bet only the best situations. A professional video poker player likewise walks around looking for a progressive jackpot that is high enough before starting to put coins into a slot. A professional poker player will join a game only if the other players are of lesser ability. It should not come as a surprise that a variation of that tactic works with betting thoroughbreds.

Attitude. Attitude is important in a racebook. Your attitude must be that you are willing to bet if you find a real bargain, but willing to not make a bet if you don't find a sufficiently attractive overlay.

You can't get discouraged if you go race after race without finding a worthwhile bet. You've got to be willing to bet, but not feel compelled to bet.

One caution: Attitude alone won't cause a bet to win. You still must find a bet with a positive expectation.

The easiest mistake to make is betting too many horses. If you are tempted to pick a horse in every race, and you bet a horse in every race, you will lose. You can't win if you insist on betting a race merely because you have invested a considerable amount of time analyzing it. You can't win if you insist on betting a race because you are at a racetrack and have no other race to bet.

CHAPTER 6

MONEY

MANAGEMENT

Many authors advise that money management and skill are equally important in succeeding at gambling. Many gamblers believe that money management alone can make you a winner at gambling. Unfortunately, money management can't do that. When you do not have an edge, proper money management is to bet zero! Money management says to bet only with an edge. Money management cannot turn a negative expectation into a positive expectation. Money management and skill at a game are not equally important; skill is much more important. Money management is not a substitute for skill.

Some games have a negative expectation no matter how much playing skill you have. The casino game

of craps is an example. Money management cannot help you get an edge at such a game.

The exception to the above paragraphs is tournaments. In tournaments, money management is the skill that gets an edge over the other contestants. But even in a tournament, money management does not give you an edge over the casino. Money management cannot overcome the track take.

Some people believe that proper money management can substitute for knowledge to make you a winner at horses. That is baloney. The important thing is to get an edge--to get the expected value in your favor.

EDGE DEFINED

Having an edge means if you play the game over and over, you are expected to come out a winner. If for every dollar you invest you get back an average of more than a dollar, you have an edge. This is what you should be trying to do with all the bets you make, including your horse bets.

To find your edge, you multiply each possible outcomes by its probability of occurring, and sum over all possible outcomes. An easy example is a bet on red at roulette. For each dollar you bet, you have two dollars after a win or zero after a loss. Out of 38 equally-likely numbers, 18 win and 20 lose. Multiplying outcomes times probabilities gives you the result that for each dollar you bet you end up with 36/38 of a dollar. Thus bets on red at roulette can hardly be considered an investment. For each dollar you invest you must get back more than a dollar to have an edge.

Here is another example. If a horse has a 20% chance of winning, and you can bet that horse at odds higher than 4:1, then you have an edge. Another way of

saying the same thing is if all your winning tickets on \$2 bets are for \$10 or more, and you cash 20% of your tickets, you have an edge. The same logic applies to tickets of other amounts. If all your winning tickets are \$4 or more and you win 50% or more of your \$2 bets, you have an edge. Having an edge means your expectation is to cash more dollars of tickets than the amount you bet.

Thinking you have an edge and actually having an edge are not the same thing. More bettors think they have an edge than do have an edge. Before wagering real money on any system, you ought to make pretend bets to verify that you have an edge.

Money management is something you use to decide the size of your bets after you have achieved an edge. If you don't have a positive expectation, then money management will not make you a winner.

COMBINATION OF BAD BETS

A combination of bets, each of which has a negative expectation, must also have a negative expectation.

Here is an example. My good friend Dan, who is quite intelligent and regularly beats the casinos at blackjack, told me he had heard about a winning system for betting on professional basketball games. He loved the system, and thought it was legitimate because it was based on the premise that home teams have an edge. Though Dan came to Las Vegas to play blackjack, he intended to bet his basketball system too. Here are the details as he explained them. After a home team has lost, the system says to bet one unit on it the next time it plays at home. If it loses that game, the system says to bet two units on its next home game. Dan confided these details

to me because he wanted my advice on what size of bet to use for his unit.

I asked Dan what edge he would have if he made only the first bet; that is, if he bet only on the next home game of teams that had lost a home game. Dan said he thought he would be at a disadvantage on those bets. Then I asked Dan what edge he would have if he made only the second bet, if he bet only on the next home game of teams that had lost two consecutive home games. Dan said he thought he would be at a disadvantage on those bets also. That was enough information for me to be able to tell him his optimal unit bet size: zero.

In spite of Dan's intelligence, he had convinced himself that he had a system worthy of being called an investment. It took him several minutes of thinking about it to agree that the two-bet combination could not have a positive expected value if each bet individually was a bad bet. You cannot combine two (or more) negative-expectation bets and come up with a positive expectation. If Dan's system had been any good, either the first bet or the second would have had to have a positive expectation. Or both of them could have had positive expectations when considered individually. But since he admitted that each of them had negative expectations when considered alone, then the combination of them must also have a negative expectation.

This book is about betting horses, not basketball. I used the basketball example hoping that you would understand the point without emotional involvement. The same logic applies to horse bets. If each individual bet in a system has a negative expectation, then the system will lose money. Some horse systems involve betting two horses to win per race. If a system is a loser

picking one horse per race, then it must be a loser picking two horses per race. Adding a second horse (or a third horse) cannot turn a bad system into a good one.

The only thing a system composed of many bets does is give you tickets to cash after each race. When you make one \$100-to-win bet on a race, you may win but there is a good chance you will lose \$100 on that race. If you bet \$100 on the race in the form of fifty different \$2 bets, the chance of losing the whole \$100 shrinks but you are less likely to be a big winner on the race. There is no free lunch here. The average bettor of random horses turns \$100 into \$80 no matter how the \$100 is split up. If you like to cash tickets and don't mind losing, you too can turn \$100 into \$80 race after race.

COMBINATION OF GOOD BETS

In any combination of bets that has a positive expectation, at least one of the individual bets must have a positive expectation. For example: Some horse systems advise betting two horses per race. If betting two horses has a positive expected value, then betting one or the other alone must have a positive expected value.

If a system contains some bets that have positive expectation and some that have negative expectation, then the system can be improved by eliminating the bets with negative expectation. For example: If a money-making system advises betting two horses per race, and if betting one of them alone has a negative expected value, then you are better off betting only the other one.

Another example is the arbitrage possibilities on shippers, betting against regional favorites, as was discussed in chapter 3. In the 1988 Kentucky Derby, if betting on Winning Colors in New York and betting on

all of her opponents in southern California could have guaranteed a profit, then at least one of those bets must have had a positive expectation. You possibly could have had a higher (but no longer guaranteed) expected win had you made only some of those bets. For example, betting against Winning Colors in southern California might have had a higher expected win if only some of her opponents had been bet, rather than all of them. Or perhaps the only positive expected value was betting on Winning Colors at odds above a certain level, while bets on her opponents reduced the risk at the cost of reducing expected value.

Another example: Some handicappers believe that a player who can afford to bet big has a huge edge over small bettors in pick six competition. That is nonsense. If the player who makes a large number of bets has an edge, then at least one of his bets must have an edge. Any bettor who makes that one bet would have the same edge on it, whether it is his only bet or he has spread thousands of dollars around on other bets. Another way to see this is to imagine a collection of small bettors whose aggregate bets exactly duplicate the bets of the big bettor. Whatever edge the big bettor has must be matched by the average edge of the small bettors who in total are duplicating the big bettor's bets. The edge in pick six competition belongs to the person who is best at handicapping, not to the person who bets the most money.

WHEN YOU ARE WINNING

Likewise, money management can't turn a series of negative-expectation bets into a winner by basing bet size on whether you are winning, despite anything any other gaming author has written.

Some people advise that you can beat a negative-expectation game by quitting when you are ahead, as if quitting whenever you are a winner will make you an overall winner for your gambling sessions. It doesn't work that way. Quitting when you are ahead and continuing to bet when you are losing will make you a winner most of the time, but overall you will lose because your wins will be small and your losses will be large. An extreme example of this is doubling up after losing, called a *Martingale*. You win almost all the time, but those wins are small and are overwhelmed by infrequent but huge losses.

Betting more when you are "hot," meaning when you have been winning, and less when you are "cold" has the opposite result: You have many small losses and a few large wins, but total losses still overwhelm total wins.

HOW MUCH TO BET

That takes care of what money management *won't* do. What *will* it do? Money management means deciding how much to bet when you have an edge. If you have neither an advantage nor a disadvantage (mathematicians call this a fair game), or if you have the worst of it, money management says bet zero.

So you have to get an edge before you can make intelligent bets. Money management then describes the process you use to decide how much to bet.

There are advantages to betting bigger, and also to betting smaller. After you win you wish you had bet more, but after you lose you wish you had bet less. The more you bet the more your bankroll suffers when you lose; but the smaller you bet the less you have to show for a winning streak.

For a given amount of risk, you are better off risking a higher percentage of your bankroll on bets on which you have a larger edge. The relationship is linear. For example, if you have a 10% edge you should bet twice as much as if you have a 5% edge.

If you have a numerical estimate of your edge, that tells you what fraction of your bankroll to bet on even-money horses. If you have a 5% edge on an even-money horse, you should bet 5% of your bankroll; if you have a 20% edge on an even-money horse, you should bet 20% of your bankroll. This advice is called the Kelly criterion after John L. Kelly Jr., the person who first published it. Since you are more likely to be overestimating your edge than underestimating it, you might want to bet something less than the proportion that you think is your edge.

The next few paragraphs cover the situation of having an edge on a horse that is longer than even money.

Risk describes the way the various possible outcomes differ from the average outcome. *Variance* is a number mathematicians use to measure risk. The higher the variance, the higher the risk, and the less you should bet. The reason for using variance instead of some other measure of risk, such as standard error, is with variance the Kelly relationship is approximately linear. A bet that involves twice the variance justifies a bet approximately half the size.

There is an easy way to implement the variance aspect of money management when there is only one possible outcome besides losing your whole bet: Bet an amount equal to edge times bankroll divided by win odds. Thanks to John Slivka for contributing this point.

Edge over odds is the optimal Kelly bet, and is not an approximation.

The optimal Kelly bet applies if your edge is known with certainty. You may want to be less than the optimal Kelly bet because you are estimating your edge. Many authors recommend betting half the Kelly bet.

If you are betting into a pari-mutuel pool, you can't make such a large bet that you drag down the odds. This might mean betting less than the amount calculated by the Kelly formula.

EDGE TIMES BANKROLL DIVIDED BY WIN ODDS

Here are some examples for applying the Kelly formula. Suppose you think you have a 10% edge on a horse going off at 5/2. How much should you bet per \$1000 of bankroll? 10% of \$1000 is \$100. Divide that by 5/2. The answer is \$40. Your optimal Kelly bet is \$40 per \$1000 of bankroll.

Suppose you think you have a 5% edge on a horse going off at 4/5. How much should you bet per \$1000 of bankroll? 5% of \$1000 is \$50. \$50 divided by 4/5 is \$62.50. Your optimal Kelly bet is \$62.50, but of course you can only bet an integral number of dollars.

Suppose you think you have a 20% edge on a horse going off at 30:1. How much should you bet per \$1000 of bankroll? 20% of \$1000 is \$200. Divide that by 30. The answer is \$6.67. So even with that huge edge, the optimal Kelly bet is less than \$7 from a bankroll of \$1000.

The Kelly method gives you optimal bets on things other than horse. Suppose you have a football bet

that you think has a 60% chance of winning; that is, your team has a 60% chance of covering the spread. In most of the sports books of Nevada, you wager \$11 to get \$21 back if your team covers the spread. What is your optimal Kelly bet per \$1000 of bankroll? If each \$11 bet will turn into \$21 exactly 60% of the time, you expect the average \$11 bet to turn into \$12.60. Betting \$11 to receive \$12.60 is an edge of $1.60/11$, or 14.5%. You are getting 10:11 odds on your bet. Dividing your edge by 10/11 yields 16%. Therefore, your optimal Kelly bet size is \$160 per \$1000 of bankroll. Thanks to Marvin L. French for this example.

Suppose you can predict with accuracy that the number 7 at roulette will occur with 5% probability. You get odds of 35:1 for betting 7 straight up. What is your optimal bet size per \$1000 of action? First you need to find your edge. Turning one chip into 36 chips with 5% probability means the average chip you bet on 7 will become 1.8 chips. That is an 80% edge. Dividing 80% by 35 yields almost 2.3%. For this example, the optimal Kelly bet is \$23 per \$1000 of bankroll.

ALTERNATIVE CALCULATION

An alternative way to do the same calculation is to start with: If your bet wins, you want to increase your bankroll by the amount of your edge. Then figure out what your bet size must be to accomplish that.

For example, suppose you have a 15% edge. If that bet wins, you want to increase your bankroll by 15%, which means winning \$150 for each \$1000 of bankroll. How much do you have to bet to win \$150? That depends on the odds. On an even-money bet, you'd have to bet \$150 to win \$150. On a 25:1 long shot, you'd have to bet \$6 to win \$150. On a 10:11 sports bet, you'd have to bet \$165 to win \$150.

CHAPTER 7

HOW THE TRACK CALCULATES ODDS

This book assumes pari-mutuel betting. That means all the bets on all the betting interests in the race are added together, the track takes out its share, and the remainder is awarded to the winning bettors. This is the standard way of conducting wagering on horses in the United States and most of the rest of the world.

Before the race you have information about every horse in the race. You also have information about how

much money has been bet on each horse so far, updated at one-minute intervals on the tote board.

This chapter explains how to calculate the payoffs for the various bets you can make.

WIN

Figuring win payoffs is easy. The track starts with the total dollars bet to win, subtracts its take, and divides the remainder by the number of dollars bet on the winning horse. It multiplies by \$2. Then it rounds down to a multiple of twenty cents.

The amount of the track take varies from state to state, and is subject to change. Currently California tracks take 15.33%, major east coast tracks take 17%, and other tracks take about the same; some take a little more. The track takes are listed atop the race results in *Daily Racing Form*.

In pari-mutuel wagering, odds are set by the bettors. The more money wagered on a horse, the lower the odds on that horse.

Example. Here is an example of how pari-mutuel odds are set. Suppose there are six horses in a race, and the amounts wagered on each are \$40,000, \$20,000, \$10,000, \$5,000, \$2,000 and \$1,000. That's a total of \$78,000.

The track takes a share, generally in the 15% to 18% range. Let's assume 17%, leaving \$64,740 to be distributed to the holders of winning tickets.

Suppose the horse with \$20,000 of bets is the winner. \$64,740 divided by \$20,000 is 3.237. That will be rounded down to the nearest tenth, a process called *breakage*, in this example to 3.2. This is another way the track makes money

This 3.2 will be reported in two ways. One way is the payoff. Each dollar bet on the winning horse is now worth \$3.20, but the results will be reported per \$2 bet; thus the winner will be reported as paying \$6.40. The total payouts will be \$64,000 instead of \$64,740; the difference of \$740 is also called the breakage. In this example, the effective track take is 17.95%. Since breakage varies from race to race, the effective track take varies slightly from race to race.

The other way the 3.2 will be used is in reporting the odds. The 3.2 includes the initial bet. When the initial bet is subtracted out, each dollar bet on the winning horse brings a win of 2.2 dollars; this 2.2 is the amount reported as win odds.

In the terms used for casino table games, the 3.2 is the odds *for* 1, and the 2.2 is the odds *to* 1. In other words, two ways of expressing the same thing are: 3.2 for 1 and 2.2 to 1.

The win odds of all the horses in the race are based on the \$64,740. They report what the odds would have been had that horse won the race. For this example, the win odds of the horses in the race would be reported as 0.6, 2.2, 5.4, 11.9, 31.3, and 63.7.

Example: scratch. You can use these numbers to demonstrate other things too. Suppose the horse with \$10,000 bet on it is a last-minute *scratch*, meaning it cannot run. It is taken out of the race, and the \$10,000 bet on it is refunded in full. Now there is only \$68,000 bet on the remaining five horses. The math proceeds as above, but starting with \$68,000 instead of \$78,000.

Example: dead heat. Suppose two horses tie for the win—a *dead heat*. The procedure now is more complicated.

Let's use the six-horse example with \$78,000 bet. Suppose the two horses tying for the win are the ones with \$40,000 and \$1,000 bet on them. The \$64,740 remaining after the track takes its cut is split between the two winning horses, but not equally. First the amounts bet on the two winning horses are subtracted out. Subtracting \$41,000 from \$64,740 leaves \$23,740. This \$23,740 is the amount that is split equally between the two winners: \$11,870 each. Thus the \$40,000 bet on the favorite is now worth \$51,870, and the \$1,000 bet on the long shot is now worth \$12,870. Dividing by the amounts bet and multiplying by 2 to state the results per \$2 bet yields \$2.5935 to the favorite, which breakage reduces to \$2.40; and \$25.74 to the long shot, which breakage reduces to \$25.60.

Relative chance of winning. If the bettors at the track think one horse has twice as much chance of winning as another horse, they will bet twice as much money on the one as on the other. This does not mean each bettor will bet twice as much on one horse as on the other; rather, it refers to the total bets made by all bettors.

Relative chance of winning is reflected in the odds *for* one, not the win odds *to* one as reported in racing newspapers. For example, suppose two horses are shown on the odds board as 3 and 6. Does this mean the bettors think the first horse has twice as much chance of winning as the other? No. The ratio of chances to win assigned by the bettors is those numbers plus one, or 4 and 7.

PLACE

A place bet wins if the horse finishes first or second. The amount of the payoff depends on which

horse finishes in the other place spot. If the other place horse is a big favorite, your place payoff will be lower; if the other place horse is a long shot, your place payoff will be higher.

The track take is the same as for win bets.

Suppose \$100,000 has been bet on all horses to place, of which \$20,000 has been bet on the winner and \$8,000 has been bet on the second-place horse. The arithmetic starts out the same as on the win pool: The track takes its 15% to 17% share off the top. Let's use 17% again. 17% of \$100,000 is \$17,000, leaving \$83,000 for distribution to the two place horses.

Next the amounts wagered on the two place horses are deducted. Subtracting wagers of \$20,000 and \$8,000 from the \$83,000 leaves \$55,000 as net winnings to be split between the two place horses. It is split equally, \$27,500 per horse. So bettors on the first horse receive their \$20,000 original bets plus \$27,500 of winnings for \$47,500 total, and bettors on the second horse receive their \$8,000 original bets plus \$27,500 for \$35,500 total.

Next express the payoffs per \$2 bet. \$47,500 divided by \$20,000 times \$2 equals \$4.75 for the first horse, which breakage rounds down to \$4.60. \$35,500 divided by \$8,000 times \$2 equals \$8.875 for the second horse, which gets rounded down to \$8.80.

SHOW

A show bet wins if the horse finishes first, second, or third. Track take on show bets is the same as on win and place bets. Calculation of show payoffs is similar to that of place payoffs.

Here is an example. Let's start with \$100,000 total bets again. Suppose the amounts bet to show on the first three horses are \$30,000, \$20,000, and \$6,000. The track

takes its 17% off the top, leaving \$83,000 to be distributed to the show bettors.

Next the amounts bet on the top three horses are subtracted out, leaving \$27,000 in winnings to be split equally among the them; that's \$9,000 per horse.

Now add that \$9000 to the amount bet per horse, divide by the amount bet per horse, and multiply by \$2. The results are \$2.60, \$2.90, and \$5.00. The \$2.90 gets rounded down to \$2.80; the other two numbers are already multiples of 20 cents so they don't need rounding.

If two of the first three horses are tied together as an entry or field, the calculations are the same for place. The two horses tied together are treated as one, and the other horse is treated as one.

MINIMUM PAYOFF

In the United States, the minimum payoff is \$2.10 (though at least one state specifies a minimum of \$2.20). If the calculations of payoffs as shown above result in numbers below the minimum, the payoff is set at the minimum. Generally when this happens the reason is one horse in the money is an overwhelming favorite.

To work out an example, suppose the show pool is \$40,000, \$29,000 of which has been bet on the big favorite. Suppose the other two horses in the money have \$2,000 and \$1,000 bet on them. After the 17% track take has been taken out of the show pool, \$33,200 is left to distribute to the three show horses. Subtracting the three show bets leaves \$1,200 winnings to split among the three horses, which is \$400 per horse. The show payoff to the big favorite is theoretically \$29,400 divided by \$29,000 times \$2, or \$2.03, which gets rounded

up to \$2.10 to meet the minimum. The show payoffs on the other two horses work out to be \$2.40 and \$2.80.

MINUS POOL

Sometimes the total amounts bet on all the horses in the money are so large in relation to the total pool that the minimum payoff requires the track to pay out more money than it takes in on that pool. For example, if there is \$103,000 total in the show pool and the amounts bet on the top three horses are \$95,000, \$3,000, and \$2,000 for a total of \$100,000, the track will pay out \$105,000 to the lucky winners, \$2000 more than it took in.

Don't use a minus pool as a reason for making a bet. The big favorite must finish in the money for the track to pay out more money than it takes in. If the big favorite finishes out of the money, the track makes its usual percentage. Often the show pool is considerably larger than normal if bettors expect a minus pool, so if the big favorite finishes out of the money the track takes its usual percentage of an amount much larger than usual.

EXACTA OR PERFECTA

For exotic bets such as exacta (perfecta is the same as exacta), the track take varies from state to state, and sometimes is higher than on win bets. Examples: California 20.08%, New York 17%, Maryland 19%, Florida 23%.

To win an exacta bet, you must pick the first two horses in the correct order of finish. The payoff is the usual: total pool less track take divided by amount bet on the winning combination times \$2 rounded down to the nearest multiple of twenty cents.

The payoff on a win bet must be related to the payoffs on exacta bets, because the equivalent of a win bet can be constructed from exacta bets. To do the arithmetic, pick a dollar payoff (example: \$100) and for each exacta with your horse on top, figure out how much you would have to bet to receive that payoff if that exacta wins. Add up all the required exacta ticket costs and compare the total with the amount of a straight win bet required to achieve the same payoff. Whichever is the cheaper way to achieve the payoff is the better bet. Some handicapping books suggest making the calculation before making a win bet to see if you are better off with a collection of exacta bets. In a racebook, with only sporadic information on prospective exacta payoffs, this is not possible.

In May of 1989 Poker Palace paid 15% extra on all winning daily double and exacta tickets, making exacta bets more attractive than win bets in spite of the lack of information regarding probable exacta payoffs.

QUINELLA

A quinella is similar to an exacta in that you must select the first two finishers in the race, but you do not specify the order in which they finish. Many tracks do not offer quinellas. The track take is the same as for exactas. The calculation of the payoff is as usual.

In Nevada racebooks, a house quinella is offered whether or not the track offers a quinella. To win the quinella, you must pick the first two horses but you don't need their order. The casino calculates the house quinella payoff as win price of the winning horses times place price of the second horse divided by two. How that figure is rounded varies from casino to casino: Some round up, some round down, and some round off.

For example, suppose the winner pays \$5.60-\$3.00-\$2.40 and the second horse pays \$4.60-\$3.20. Win times place divided by two is 5.60 times 4.60 divided by 2, or \$12.88. Some casinos round that to \$12.80, and some to \$12.90.

TRIFECTA

In a trifecta, another one-race bet, you must pick the first three horses in exact order of finish. The track take is the same as for exactas. The calculation of the payoff is as usual.

What the rest of the country calls a trifecta, New York calls a triple.

Some casinos offer a house trifecta whether or not the track offers a trifecta. To win it, you must pick the first three horses in the correct order. The payoff is win price of the first horse times the place price of the second horse times the show price of the third horse times a multiplier. The multiplier generally is in the range of 1.0 to 1.2, and varies from casino to casino.

DAILY DOUBLE

To win this bet you must pick the winner of two consecutive races, generally the first two races of the day. The track take is the same as for exactas, and the payoff is as usual.

TRIPLE

Winning the triple means picking the winner of three consecutive races. The track take sometimes is higher than on exactas; examples are California 20.08%, New York 25%, Maryland 25%, Florida 23%. The calculation of the payoff is as usual.

What this book calls a triple, New York calls a Pick Three and Florida calls a Bet Three. What New York calls a triple, the rest of the country calls a trifecta.

PICK SIX

The pick six is a bet involving selecting the winners of six consecutive races. Some tracks do not offer a pick six. The track take generally is the same as for triples.

There is some track-to-track variety in payoffs for a pick six. Hitting six winners always wins, but it may not win the whole pot. Some part of the pot may be given to people who successfully pick five races out of the six, and sometimes even people with four winners will get a small piece of the pot.

If nobody successfully picks all six winners, some of the pot may be held over to the next day; this is called a carry-over. Payoffs are made to people with the most winners, and sometimes to people with the next-most winners.

PICK NINE

The pick nine differs from the pick six in that nine races are used rather than six. Carry-over pools are the usual because picking the winner of all nine races is almost impossible. When the pool gets large enough, it must be paid out even if nobody correctly selects nine winners. On those days the payoffs to winning tickets generally exceed the amounts bet on the pick nine.

CHAPTER 8

OVERCOMING

THE TRACK

TAKE

Suppose we flip a coin, heads you win and tails I win. Suppose we use a fair coin and a completely random flip, so that each of us has a 50% chance of winning. Suppose we bet \$5 per flip. First flip is tails, and I win \$5 from you. Next heads, you win \$5 from me. Then our friend PM wanders along, and announces that he wants to play too. Only PM doesn't like to lose—he wants to win \$2 per flip without betting anything. Being nice guys, we allow PM to join our game. Next flip is heads, and I lose \$5 of which you get \$3 and PM gets \$2. Next flip is tails, and you lose \$5 of which I get \$3 and PM gets \$2.

If we play this game long, you and I are both going to be losers and PM will have most of our money. It is difficult to imagine one of us being lucky enough to be ahead if we play more than few games. You might be wondering why we were so nice as to let PM join our game.

Of course by PM I mean pari-mutuel. Flipping coins to either win \$3 or lose \$5, with the other \$2 going to PM, is what happens when we bet into a pari-mutuel system. The \$2 that PM takes out of each coin-flip game is the same amount as the pari-mutuel system takes out of our bets when we each make a \$5 bet for \$10 of total bets. In horses, as in flipping coins with PM, if you lose you lose \$5 and if you win you win \$3. The main thing that complicates the situation with horses is most horses have other than a 50% chance of winning. But PM still gets his \$2 every time you and I make \$10 worth of bets.

This chapter contains numerical examples showing how the odds at the track must differ from the true odds in order for you to overcome the track take.

Suppose that you know the probability of each horse winning the race. Suppose the probabilities are as shown in table 7. (Any resemblance between the names of horses in table 7 and the names of real horses is purely coincidental.) Note that each horse in the race has a number, meaning that each horse has a chance to win.

The horse named Alpha has been assigned a 50% chance of winning the race. If there were no track take, and if the bettors at the track evaluate the horse's chances perfectly, it should go off at even money. The relationship between the horse's chance of winning the race and the win odds is as explained in the preceding chapter. For example, Echo has .04 chance of winning the race,

Table 7
Example: Exact Odds of Winning

<i>Horse</i>	<i>Prob.</i>	<i>B-E Odds</i>
Alpha	.50	1
Beta	.25	3
Charlie	.12	7.33
Delta	.06	15.67
Echo	.04	24
Foxtrot	.02	49
Grover	.01	99
<i>Total</i>	<i>1.00</i>	

the reciprocal of .04 is 25, and 25 minus 1 is 24; so table 7 shows 24. Note that the total of the probabilities in table 7 is 1.00.

TYPICAL TRACK ODDS

Now let's create a table of typical track odds for the horses of table 7. This means recognizing the existence of a track take. The bettors as a group get back less than they wager. Let's use 17% as the track take, a number that is around the midpoint of the range you encounter at racetracks. The track gets its money off the top, with no risk. It does not matter which horse wins the race; the track gets its 17% regardless. If you bet an extra \$100, the track takes an additional \$17.

In the example you can handle this either of two ways. Either you can treat total bets as being 100 units, give 17 of those units to the track, and distribute the remaining 83 units among the winning bettors; or you can use the reciprocal of .83 and treat total bets as being

120.5% of the amount being distributed to bettors. With the latter method you can use the probabilities from table 7 in a more direct fashion to identify situations where you have an edge. This is the method table 8 uses.

There is nothing special about the numbers in the “\$ Bet” column of table 8 except that their total is 120.5. They represent one way that the bettors might spread their 120.5 of bets over the horses in the race. The last column in table 8 is the win odds for these horses after track take and breakage. (Table 7 ignores breakage.)

If you multiply the probabilities of table 7 times the track odds *for 1* (table 8’s odds plus one) and sum, you will come up with less than 0.83. The reason is breakage; the odds in table 8 have been rounded down to tenths as a racetrack does. This is why, for example, the odds on Alpha are 0.8 instead of 9/11, which is slightly higher than 0.8.

Table 8
Example: Typical Track Odds With
17% Track Take

<i>Horse</i>	<i>Prob.</i>	<i>\$ Bet</i>	<i>Odds</i>
Alpha	.50	55	0.8
Beta	.25	30	2.3
Charlie	.12	14.5	5.8
Delta	.06	8	11.5
Echo	.04	6	15.6
Foxtrot	.02	4	24.0
Grover	.01	3	32.3
<i>Totals</i>	<i>1.00</i>		<i>120.5</i>

Now compare table 8 with table 7. Carefully compare horse by horse. Note that with the bets that have been assigned, there is no horse that you could bet to get a positive expected value, or even to win your money back on average. Every horse is a losing bet in the expected-value sense. A bet on Alpha requires even money to break even, but the horse is 4:5. A bet on Beta requires odds of 3 to break even, but is 2.3. In this example the long shots are worse yet: Grover requires win odds of 99 to break even, but is only 32.3.

Is table 8 unusually bad? No, it is typical. It even has the favorite as the best bet, “best” meaning you lose at the lowest rate if you bet on it. The extra 20.5 that represents the track take must be bet somewhere, and the results in table 8 typify the bettors doing a great job of pricing the horses. They priced the horses in the correct order of probability of winning, and no one horse was out of line compared with the others. What makes table 8 scary is the fact that it is not unusual.

In most races, every horse is a bad bet. That 4:5 favorite typically has only a 50-50 chance of winning the race. That 6:1 long shot typically has only one chance in 9 of winning the race. That 32:1 extreme long shot typically has but one chance in a hundred of winning the race.

The break-even point is $\text{bet}/(\text{win}+\text{bet})$. This is the frequency with which a horse must win for the tickets you cash to equal the bets you make. If you bet on a horse going off at 32:1, it must have $1/33$ chance of winning for you to have the expectation of breaking even. Your bets on horses going off at 7:5 must win five times out of twelve for you to break even.

If you are going to show a profit, your bets must do better than that. A common profit target is 20%. A profit of 20% means getting back 120% of the amount you bet, whereas the average bettor gets back 80%. Hitting your 20% profit target means getting back 50% more than the average bettor gets back. That requires a large imbalance between chance of a horse winning and odds set by the betting public.

EXAMPLES: ONE HORSE AN OVERLAY

Here are two examples showing the distortion in track odds required to make one horse a good bet.

The favorite. The purpose of this example is to show the distortion in track odds necessary to give a 20% edge to a bet on Alpha, the favorite. Let's assign 120.5 in bets again, but make Alpha the favorite at 7:5 (i.e., 1.4). These are the odds you need to make 20% profit on a bet on Alpha. If your bet wins half the time, and if your \$2 ticket returns \$4.80 when it wins, on average you are turning \$2 into \$2.40. Now let's look at how this affects the odds of the other horses in the race. This is done in table 9.

Now compare table 9 with table 7. Or compare table 9 with table 8. Note the tremendous distortion that is required in bettors' perception of all the horses' chances in order to yield a 20% edge on bets on Alpha. To get such an edge either the total money wagered by your opponents must reflect exceptional incompetence in analyzing the available public information, or you must have strong information about Alpha's chances of winning that is not available to the betting public.

Table 9
Example: 20% Edge on Favorite

<i>Horse</i>	<i>Prob.</i>	<i>\$ Bet</i>	<i>Odds</i>
Alpha	.50	41	1.4
Beta	.25	34	1.9
Charlie	.12	18	4.5
Delta	.06	11	8.0
Echo	.04	7.5	12.3
Foxtrot	.02	5	15.6
Grover	.01	4	24
<i>Totals</i>	<i>1.00</i>		<i>120.5</i>

A long shot. Table 10 demonstrates a long shot on which you have a 20% edge--Echo. At win odds of 29 it will pay \$60 for a \$2 bet when it wins, and this example assumes Echo wins 4% of the time. 4% of \$60 is \$2.40, so on average your \$2 bet turns into \$2.40, your 20% edge.

Note that less distortion is required in bettors' perceptions of horses' chances in order to get a 20% edge on a long shot than to get a 20% edge on a favorite.

One undesirable thing about betting long shots is the huge risk. Even if you could pick 29:1 horses that win 4% of the time, 96% of the time you would be coming up with losers. Though you'd have a 20% edge, you'd regularly have streaks of picking forty or more consecutive losers.

Another undesirable thing about picking long shots is: For a given edge, your optimal bet size is smaller. On a 29:1 horse you should bet only 1/29 as

Table 10

Example: 20% Edge on Longshot Echo

<i>Horse</i>	<i>Prob.</i>	<i>\$ Bet</i>	<i>Odds</i>
Alpha	.50	57	0.6
Beta	.25	31	2.2
Charlie	.12	14.17	6.0
Delta	.06	8	11.5
Echo	.04	3.33	29.0
Foxtrot	.02	4	24.0
Grover	.01	3	32.3
<i>Totals</i>	<i>1.00</i>		<i>120.50</i>

much as on an even-money horse on which you have the same percentage edge; see chapter 6.

Another undesirable thing about picking long shots, if you are betting into a small pari-mutuel pool, is you could not bet much money without bringing the odds down all by yourself.

EXAMPLES: ONE HORSE AN UNDERLAY

Here are two examples of all horses in the race being good bets except for one big underlay.

An average horse is a big underlay. With seven horses in the race, if all horses are identical the average horse would have $1/7$ or 14% chance of winning. Charlie, with 12% chance of winning, is the closest thing to an average horse in this race. Suppose Charlie is a big underlay. How much would Charlie have to be misbet so that you have a 20% edge betting on any other horse

Table 11
Example: 20% Edge on All But Charlie

<i>Horse</i>	<i>Prob.</i>	<i>\$ Bet</i>	<i>Odds</i>
Alpha	.50	41	1.4
Beta	.25	20.5	3.8
Charlie	.12	48.18	1.0
Delta	.06	5	19.0
Echo	.04	3.33	29.0
Foxtrot	.02	1.66	60.2
Grover	.01	0.83	119.4
<i>Totals</i>	<i>1.00</i>		<i>120.50</i>

in the race? You can work out an approximate answer directly. Overall bets exceed payback by 20.5% plus breakage, and that excess would have to be bet on Charlie. The probability of any horse but Charlie winning the race is .88, and the total amount bet on all those horses would have to be .73 to yield a 20% edge. The difference, 120.5% less 73%, or 47.5%, is the minimum amount that would have to be bet on Charlie. Typical numbers are shown in table 11.

For this example, table 11 shows that Charlie would have to be the even-money favorite, a *false favorite*. That is, if Charlie is merely an average horse but for some reason is bet down to even money, bets on the other horses in the race would on average yield 20% profit.

A favorite is a big underlay. Suppose Beta is a big underlay instead of Charlie. Beta is one of the favorites in the race, with a .25 chance of winning. What would the

Table 12

Example: 20% Edge on All But Beta

<i>Horse</i>	<i>Prob.</i>	<i>\$ Bet</i>	<i>Odds</i>
Alpha	.50	41	1.4
Beta	.25	58.68	0.7
Charlie	.12	10	9
Delta	.06	5	19.0
Echo	.04	3.33	29.0
Foxtrot	.02	1.66	60.2
Grover	.01	0.83	119.4
<i>Totals</i>	<i>1.00</i>		<i>120.50</i>

odds on him have to be to yield 20% profit on bets on every other horse in the race? This situation is shown in table 12. If Beta is bet down to a 3:5 false favorite, bets spread over all other horses in the race would yield 20% profit.

MOST RACES NOT BEATABLE

This chapter has demonstrated the size, if you are to profit, of the disparity that must exist between actual chance of winning and win odds established by the bettors. Either some horse by itself must be a big overlay, or some horse must be a huge enough underlay to make the others in the race look like overlays.

Selecting a horse on which to bet does not mean deciding which horse has the best chance of winning the race. Every horse entered has at least some tiny chance. You are looking for horses whose chances of winning are considerably greater than implied by the odds

established by the other bettors. For example, if you think that Alpha has a 50-50 chance of winning but its odds are 3:5, and you think that Echo has one chance in 25 of winning but its odds are 29:1, one of those horses is a good bet: Echo. If you can bet on horses like Echo over and over again, you will make money on your bets. If you bet horses like Alpha, winning \$3 the half of the time that Alpha wins and losing \$5 the half of the time that Alpha loses, you are going to go broke: PM will have your money. If someone asks you which horse you think will win, you answer "Alpha." But you bet on Echo.

You must accept the possibility that a race is not beatable, meaning there is no horse on which a bet has a positive expected value. There is also the possibility that the race is beatable, but not with the information available to you. Race after race might be unbeatable. You'll find good bets, but, depending on your handicapping skill, good bets might be rare.

This means you must be willing to watch a race without betting on it, even if you have invested considerable time studying the race. Spending time studying a race does not guarantee that you will find a worthwhile bet. To be a winner at the races, you must have the self-control to be able to watch race after race without betting, waiting for the opportunity to make a bet on which you have an edge.

WHO PAYS THE TRACK TAKE

The casino game of blackjack has undergone changes over the years. The changes started in 1962 with the publication of Edward O. Thorp's *Beat the Dealer*. Thorp's book presented a method for casino patrons to get an edge at the game. Some people did learn how to

get an edge at blackjack, and did win money. Over the years the techniques for winning at blackjack have advanced. Today's players have methods for getting an edge that were unknown in 1962. So today most blackjack players are winners, right? Wrong. The casinos still profit from dealing the game, as they must if they are going to continue to offer it. To keep making profits over the years, casinos have made changes in the rules and procedures. Since 1962 there have been both professional blackjack players and casinos making money dealing blackjack. If the existing professional blackjack players continue to increase their skills at the game, or if the number of professional blackjack players increases faster than the number of blackjack tables, the casinos will continue to fine-tune their rules and procedures to continue to make a profit.

Racetracks have it easier than casinos. Racetracks do not have to fine-tune their rules and procedures to continue to make money in spite of increasing handicapping skills on the part of their patrons. The track take comes off the top; in percentage terms it is guaranteed. Someone must pay it. Some authors of handicapping books act as if the only reason casual handicappers lose is insufficient handicapping skill. That is correct in the individual case, but not in aggregate. As a group, casual handicappers must continue to lose no matter how skilled they become, because the track take must be paid. If a particular casual handicapper increases his level of skill to the point where he can win at the track, then he is a professional rather than casual handicapper. If this new professional goes to the track and wins, other racetrack patrons must win less or lose more because the track take must be paid.

For the same reason, educating the masses won't help them win. The track take must be paid. If a new publication with better handicapping information becomes available to the betting public (as has happened with *The Racing Times*), those handicappers who use it will outperform those who do not use it. Each racetrack patron must now be better informed to continue to win or lose at the same rate as before. No matter how good it is, no publication can turn the betting public into winners. The track take must be paid. Professional handicappers should be disappointed to see better handicapping information readily available because that makes the game harder to beat. At the extreme, if all handicappers had all handicapping information and interpreted it correctly, then nobody would have an edge. The only way for casual handicappers as a group to lose at a lower rate is for the track to take a lower percentage.

In the pari-mutuel system, odds at the racetrack are set by the bettors, and they seem to do an excellent job of pricing horses. The odds on each horse fairly accurately reflect that horse's chances of winning. Undoubtedly some part of any pool of bets at a racetrack is wagered by people who are picking lucky numbers or horses with names that have special meaning for the bettors. However, the totals of such bets appear to be insignificant portions of the total pools.

Generally when you find a horse that you know to be good and that the morning line puts at high odds, the other bettors will agree with you and bet it down.

The reason win odds fairly accurately represent a horse's actual chance of winning is that most of the money at any racetrack is bet by regulars--patrons who

attend the races almost every day. These people know how to read racing newspapers. They know the local horses, local jockeys, and local trainers. They know how the weather affects the local track. They share information with each other. Few if any of them pay their living expenses with their racetrack winnings, but they do an excellent job of pricing horses.

Some races are represented by multiple sets of pari-mutuel odds. For example, some off-track wagering facilities have their own pari-mutuel pools instead of tying in with the pools at the racetracks. Racing newspapers list payoffs for the winners in various pools. On average, the on-track payoffs are lower, meaning the on-track bettors do a better job of pricing horses than off-track bettors.

The track take varies by state, and is generally in the 15% to 18% range for straight bets to win, and sometimes more on the exotic bets. In addition, the track rounds the payoffs down to the nearest twenty cents on a two-dollar bet, which has the effect of making the effective track take larger. Let's use 20% as a round-number estimate of the effective track take.

The other bettors are your competition. These are the people you must outperform to win money at the racetrack. And you must outperform them by a huge margin because you are bucking the track take plus breakage, which together can exceed 20%. A 20% effective track take means you need to get back about 25% more money than the average racetrack bettor in order to break even. (80:100 is the same thing as 100:125.) Outperforming the average bettor is not enough to make money; you must outperform the average bettor by more than 25%!

Now, add in the fact that some people have the expectation of doing better than losing at a rate of 20%. Some handicappers are skillful enough to make a living betting on horses. And there are people who come to the track with inside information about the prospects of one particular horse: Their bets on that horse are expected to do better than lose at a rate of 20%. Andrew Beyer expresses this particularly well on page 57 of his *My \$50,000 Year at the Races*: "Racetrack betting is a constant battle of wits between outsiders and insiders—between handicappers with superior analytical skills and horsemen with access to private information."

One might think that selecting horses by throwing darts at a copy of a racing newspaper would guarantee that one would lose at the average rate. Such is not the case if any patron has the expectation of winning. The overall track take stays the same. If one bettor has an expectation of winning, then the other bettors have an expectation of losing at a rate greater than the track take. The size of the pie has not changed, but it is being shared unequally.

Suppose that of \$125,000 wagered on a race, \$2000 is bet by a *fixer*. (A *fixer* is someone who, probably through bribes or threats, illegally influences the result of a contest.) Suppose that the fixer has put his money on the horse he knows for certain will win. What percentage disadvantage will the other bettors face? The racetrack will still get its take plus breakage, leaving approximately \$100,000 to be distributed to the fixer and others who bet on the winning horse. How much of that \$100,000 goes to the fixer and how much to others depends on how good a job the fixer has done of keeping his work secret. If many people at the track

have caught on and bet the fixer's horse down to even money, his \$2000 will turn into \$4000. In this case the \$123,000 bet by other than the fixer will return about \$96,000, or about 78% instead of the usual 80%. If the fixer has done a great job of keeping his work a secret and his horse comes in at say 20:1, his \$2000 investment will be worth \$42,000. This means the bettors of the other \$123,000 will receive but \$58,000, or 47% of the amount they wagered. The amount won by the fixer comes out of the pockets of the people betting against him.

You might think you could guarantee that you would lose at the rate of the track take plus breakage by wagering appropriate amounts on each horse in the race. The flaw in this logic is you do not know the appropriate amounts to wager until it is too late to make any more bets. The fixer can wait until the last minute to bet his \$2000. Suppose his horse wins at 20:1; had it been 40:1 with a minute to go, you would have bet only half as much on it as you should have to hold your losses to the level of track take plus breakage.

Fixing of races is discouraging for handicappers. It's hard enough to win when the races are honest. An honest handicapper is donating his money when unknowingly betting on a fixed race. Fortunately, fixed races seem to be rare. Too few races are fixed to make it worth your while to try to spot them and bet with the fixer.

The slim chance of a race being fixed is not the only reason the casual handicapper can be expected to do worse than lose at the rate of track take plus breakage. The existence of people who have the expectation of doing better than average means other bettors must lose faster than average because the track take must be paid.

CHAPTER 9

TESTING A

THEORY

The idea of testing a theory by taking a sample and looking for statistical significance has been around for a long time, though it generally has been ignored in the literature of handicapping. In this field the norm seems to be for respected authors to present logical-sounding theories accompanied by examples, but not accompanied by samples large enough to establish validity according to customary levels of statistical significance. Long-ago authors had the excuses of lack of information and lack of computing power. Today's authors have plenty of information and plenty of computing power, and with this chapter they have the methodology for establishing statistical significance with reasonable sample sizes.

PROCEDURE

Hypothesis. You start by forming a hypothesis. This means you make a clear statement of what you are going to test. It is best to write down all aspects of the hypothesis.

Designing a test. It is easy to work with back issues of a racing newspaper to test some theory or other. Suppose for example you want to see how you would have fared had you bet on horses that have recently won under the same jockey. You must define “recently” explicitly--do you want two weeks or two months or what? What are you going to do with a horse that finished first but was disqualified--is it in your sample? How about a horse that finished second but was awarded the win when another horse was disqualified? What about a horse that was part of an entry? Should you expect a horse to win, or is finishing a close second close enough; and if you will accept a close second, how close—a nose, a head, or what?

The reason you must be explicit about all of these things before you start gathering sample data is that you are in danger of biasing your results if you make such decisions while gathering data. You want your sample to be an unbiased test of your hypothesis.

TEST USING THE SAME RACES

Roulette is a casino game with a ball that is spun around a track and falls down into one of 37 or 38 numbered slots. I could watch a hundred rolls of the ball, keeping careful track of which numbers won. Then I could analyze the results to find out which numbers tended to follow which numbers. Maybe I'd find a profit for betting odd after two consecutive even numbers, red

after a red-black-red sequence, and so forth. Suppose I did this and used my data to devise a roulette system, and offered to sell it to you. Would you buy this system? Your answer should be NO. Such a roulette system could only tell you which numbers tended to follow which numbers for the 100 rolls I happened to watch. Only by coincidence would that system work on a different 100 rolls. You don't have the option of betting on the 100 rolls I watched, so my roulette system would be worthless to you. It would be a real surprise if it worked on balls that have yet to be spun.

Understanding why such a roulette system is worthless makes it easier to understand why some horse systems are worthless. Suppose I carefully analyzed the results of 100 horse races to find the characteristics of the winners. I could come up with a system that would have made money had I used it for those 100 races. Of course I didn't use it to make money on those races because I didn't formulate the system until those races had already been run. But I could write an ad telling you how much money you could have made had you used my system on those 100 races. Would you be willing to bet your money on that system? Again, your answer should be NO because you don't have the option of betting the particular 100 races on which the system would have worked.

Yet this is what some horse systems do. The creator of the system has analyzed the results of a sample of horse races, and has figured out how he could have bet to make money on those races. In his ad he tells you how successful his system was on those races. What he doesn't tell you is that he didn't actually use his system on those races, because the system wasn't finished until

after the races were run. In fact, he fine-tuned his system to handle those races after they had already been run and he knew the results. It would be a real surprise if his system worked on races that have yet to be run.

TEST USING DIFFERENT RACES

The only acceptable way to test a system is with a different set of data than was used to formulate the system. It is acceptable to analyze the results of 100 or more races to formulate a system. But that is not the point to stop. The system must be tested against a different set of data. If the system needs tinkering (the system creator would probably say “fine-tuning”), then fine, modify the system; but then the testing must be started all over again, using a different set of data than has been used to formulate the system or to modify it.

Few sellers of horse systems do this, probably because few horse systems do well when tested against races different from those the system seller used to create his system. If the system seller can't successfully test his system against a new set of races, then what chance is there that the purchasers of his system will be able to use his system successfully against races that have yet to be run? Answer: none.

Look back at the tests in chapters 3 and 4. Those tests use data gathered after the hypotheses were formulated. The sample sizes are large enough for statistical significance. There is no artificial discarding of particular races where the results happened to conflict with the theory. A person using more handicapping expertise should be able to outperform those test results.

TESTING WITH LIVE RACES

The best way to test a system is to make bets (pretend or real) before the races are run. If you think a horse fits the model, you write it down as a bet. If you don't think a horse is quite what you are looking for, you don't add it to your sample.

No cheating! If, after a race has been run, you happen to notice that an entrant would have met your criteria, you don't add it in. This is important. It is much easier to pick winners after you know the results, but by then you no longer have the option of making bets, so you must scrupulously avoid any past-posting in your study. You don't eliminate any horses after post time, either. If a horse was in your sample at the last instant you could place a bet, then it stays in your sample even if you belatedly find information that would have caused you to leave it out.

Only if you take your sample in this manner can you have any confidence in your results. Fudging horses into your sample and fudging horses out of your sample contaminate your results so that they are useless in telling you whether a system works. If a system works, it will eventually make enough money to overcome any horses put in or left out by mistake.

BET SIZE

You must also decide how much to bet on a horse. Here is a suggestion. Instead of betting (or pretend-betting) the same amount on every horse, bet an amount such that you will collect the same amount on each horse that wins.

I cannot take credit for this idea; it was contributed by Howard Stanley Warshaw. Its importance is that it

allows you to establish statistical significance with a small sample size. Chapter 3 found statistical significance in a sample of 135 big favorites. Chapter 4 found statistical significance from two horses per race for 206 races in one sample, and from two horses per race for 317 races in another sample. Probably the main reason the literature of handicapping is lacking in backup for its theories is that with a flat bet per horse, establishing statistical significance requires huge sample sizes.

\$100 is a convenient number to use for test bets with live races. Write down a bet for a horse such that if it wins, your ticket is worth about \$100. If you want to bet a horse going off at 4, your test bet is \$20. If you want to bet a horse going off at 2, your test bet is \$33. Again, writing it down is important. You can change the number you have written down if you could change a real bet; but when changing a real bet is no longer possible, the test bet can no longer be changed.

A way to get the bet size is add one to the track odds and take the reciprocal. For example, when the odds are 4, add one to get 5, and take the reciprocal: $1/5$ is 20%. For a \$100 ticket, the percent amount is the bet; e.g., 20% means bet \$20. Rounding off is okay, and rounding down is better than rounding up because toteboard odds are truncated. (For example, 5 on the tote board can mean 5.0 or 5.9 or something in between.) You might prefer to use \$30 as your bet on a 2:1 horse to simplify the arithmetic.

Another way to get the bet size for live races is to use table 13. For each win odds the table lists a bet that can be used to get a payoff of approximately \$100 if the horse wins. The numbers in table 13 are designed for use during live racing; they are selected to recognize the

Table 13
Bet to Get Payoff of \$100

<i>Odds</i>	<i>Bet</i>	<i>Odds</i>	<i>Bet</i>
60 & up	1	3.5 (7:2)	22
36 to 59	2	3	25
28 to 35	3	2.5 (5:2)	29
22 to 27	4	2	33
18 to 21	5	1.8 (9:5)	36
14 to 17	6	1.6 (8:5)	38
12 to 13	7	1.5 (3:2)	40
11	8	1.4 (7:5)	42
10	9	1.2 (6:5)	45
9	10	1	50
8	11	0.8 (4:5)	56
7	12	0.6 (3:5)	63
6	14	0.5 (1:2)	67
5	17	0.4 (2:5)	71
4.5 (9:2)	18	0.2 (1:5)	83
4	20	0.1 (1:9)	90

fact that the odds on long shots tend to get longer during the last couple of minutes of betting.

After the race, if the horse wins you figure out how much the winning ticket is worth by multiplying the win price by your test bet size and dividing by two (because the win price is based on a \$2 bet).

Testing with live races is superior to testing with already-run races. But if instead of live races you do a study with charts from old racing newspapers, you should use table 14. It is more precise than table 13, and

Table 14
Win Odds and Break-Even
Frequencies

<i>Win Odds</i>	<i>B-E Freq</i>	<i>Win Odds</i>	<i>B-E Freq</i>
0.1	0.91	2.8-2.9	0.26
0.2	0.83	3	0.25
0.3	0.77	3.1-3.2	0.24
0.4	0.71	3.3-3.4	0.23
0.5	0.67	3.5-3.6	0.22
0.6	0.62	3.7-3.8	0.21
0.7	0.59	3.9-4.1	0.20
0.8	0.56	4.2-4.4	0.19
0.9	0.53	4.5-4.7	0.18
1	0.50	4.8-5.0	0.17
1.1	0.48	5.1-5.4	0.16
1.2	0.45	5.5-5.8	0.15
1.3	0.43	5.9-6.4	0.14
1.4	0.42	6.5-6.9	0.13
1.5	0.40	7.0-7.6	0.12
1.6	0.38	7.7-8.5	0.11
1.7	0.37	8.6-9.5	0.10
1.8	0.36	9.6-10.7	0.09
1.9	0.34	10.8-12.3	0.08
2	0.33	12.4-14.3	0.07
2.1	0.32	14.4-17.1	0.06
2.2	0.31	17.2-22.2	0.05
2.3	0.30	22.3-28.5	0.04
2.4-2.5	0.29	28.6-39.9	0.03
2.6	0.28	40.0-66.6	0.02
2.7	0.27	66.7 & up	0.01

recognizes that the odds you are seeing are the final odds. Table 14 uses bet sizes such that each win is 1.00.

An alternative to using table 14 is to use a computer or calculator to figure out the reciprocals of $1 +$ odds for bet sizes, resulting in wins of precisely 1.00 each.

The bet size for a win of 1.00 is the same thing as the break-even frequency.

Two things are important here. One is to write down the bet before the race is run. You don't change it after post time even if, after it is too late to make a bet, you notice that the horse's odds have changed dramatically.

The other thing that is important is to try to make the value of each winning ticket pay approximately the same amount, such as \$100. This means you bet a different amount on each horse, with the amount depending on the win odds. The reason this is important is to reduce the variance of the outcome. If instead you bet a flat amount per horse, say \$20, then one 31:1 winner will add \$640 to your accumulated win and overwhelm your totals. Then you will need a much larger sample size for statistical significance. Had you bet \$3 on that horse, a \$64 win price would mean a ticket of \$96, about the same amount as any other win; that one horse would not have dominated your results.

INTERPRETATION OF RESULTS

Betting an amount per horse that would turn into a uniform amount if it wins has another benefit: It makes the results easy to interpret. After 200 bets of amounts such that each winning ticket would be about \$100, you might have total bets of \$5012 and 56 wins totaling \$5670. The average win was $\$5670/56$ or \$101.25. The

number of wins required to break even was \$5012/\$101.25, or 49.5. With 49.5 wins required to break even and 56 wins achieved; you are ahead by 6.5 wins.

The reason for calculating the number of wins required to break even is you can use that number to figure out whether your results are significant or likely to be a random fluctuation.

STATISTICAL SIGNIFICANCE

For the standard error of the number of wins, precise calculation is possible but not necessary. You can get a good approximation quickly: Take the square root of the break-even number of wins and multiply by 0.8. For the above example, the square root of 49.5 is approximately 7, which multiplied by 0.8 is 5.6.

You can use this number to tell you the significance of your sample results. Being 6.5 wins above the break-even point when the standard error is 5.6 wins means being ahead by $6.5/5.6$ or 1.16 standard errors. You can use a table of the normal distribution to interpret this number. A fluctuation of 1.16 standard errors or more happens quite frequently by chance alone. At 1.65 standard errors, you have a fluctuation that happens 5% of the time due to chance. A fluctuation of 1.96 standard errors happens 2.5% of the time due to chance. A fluctuation of 2.33 standard errors happens 1% of the time due to chance.

The most generally used standard of statistical significance is a fluctuation of 2.0 standard errors.

Here is the justification for using 0.8 times the square root of the break-even number of wins as the standard error of the number of wins. There are two factors involved. First is the track take, which on average means you get back 80% of each dollar wagered.

Second is the win odds. Variance for a binomial distribution is npq . The n is the number of horses you bet; p is 1 divided by the sum of 1 plus win odds; and q is $1-p$. For example, if you have selected 100 horses each of which is around 4:1, then n is 100, p is $1/5$ or $.2$, q is $.8$, and the variance is 16.

The break-even number of wins is np . Thus the variance reduces to the break-even number of wins times q . If you bet mostly on big favorites, then q will be around 0.7. If you bet mostly on 9:1 long shots, then q will be around 0.9. If you bet mostly on horses in the 3:1 to 5:1 range, then q will be around 0.8.

To apply this variance to the amount bettors get back after the track take, multiply by 0.8.

Putting it all together, the variance of your number of wins will be 56% to 72% of the number of wins you need to break even, with the 56% applying to bets on big favorites and the 72% applying to bets on long shots.

To get the standard error, take the square root of the variance. This means the standard error on your number of wins will be 75% to 85% of the square root of the number of wins you need to break even. As with the variance, the smaller number applies to betting favorites and the larger number applies to betting long shots. 80% is a nice round number in the middle, and it does a good job of describing a mix of horses that is neither all favorites nor all long shots. If you generally select big favorites, then use 75%. If you generally select long shots, then use 85%.

CALCULATING VARIANCE AND STANDARD ERROR PRECISELY

The precise way to find the variance of the number of wins is to recognize that each individual bet is described by the binomial distribution. You get the variance of the number of wins by calculating the variance for each individual bet and adding them up.

Here is how to find the variance of one bet. First, find the break-even frequency by dividing 1 by the sum of 1 plus the win odds. Then remove the track take by multiplying by 0.8; this gives you p . Then subtract p from 1, giving you q . Then multiply p times q . Example: For win odds of 2.6, the break-even frequency is $1/3.6$ or .28; p is that number times .8, or .22; and q is .78. Multiplying p times q yields .17, which is the variance on that one bet.

Do the above for each bet. Then add up all the individual variances. The sum of the individual variances is the variance of the number of wins, and the square root of that is the standard error of the number of wins.

After you do this you should have a standard error approximately equal to 0.8 times the square root of the break-even number of wins.

TESTING THE DIFFERENCE BETWEEN TWO MEANS

Suppose you have two samples, each with a mean and standard error. Testing the difference between these two sample means is the subject of this section.

For example, chapter 3, *Horses To Bet Against*, had 26.64 units bet on believable horses, resulting in 31

units won, a return of 116%. And it had 26.55 units bet on horses dropping from a better race, resulting in 20 units won, a return of 75%. How do you test the difference between these two sample results for statistical significance?

The key to testing the difference between two estimates derived from samples is: The variance of the difference is equal to the sum of the variances.

In the example from chapter 3, the standard error by the shortcut method (square root times 0.75) for the 26.64 units bet on believable horses is 3.87 units. That is 14.5% of the units wagered, so the standard error applicable to the 116% return is 14.5%.

The standard error by the shortcut method for the 26.55 units bet on horses dropping from a better race is 3.86 units. That is 14.5% of the units wagered, so the standard error on the 75% return is 14.5%.

The two variances are the squares of the standard errors, or 14.5% squared plus 14.5% squared, or .042. This .042 is the variance of the difference between the two percentage returns. The standard error of the difference between the two percentages is the square root of the .042, or 20.5%. With 116% return on one sample and 75% return on the other sample, the difference in the two returns is 41%. Dividing 41% by 20.5% to find the number of standard errors yields 2.0, so you can conclude that the difference is significant.

For a more complete discussion of testing the difference between two sample statistics, see any basic statistics textbook.

CHAPTER 10

TESTING

DIFFERENCE

BETWEEN TWO

TOTALS

This section presents a statistical test of significance for the situation where you have two totals and a null hypothesis that they should be about the same. An example is the number of winners among inside horses versus the number of winners among outside horses. If there is no bias in the racing strip, you expect to have the same number of winners from inside as from outside, except for random fluctuations.

In statistical talk, your null hypothesis is that inside and outside horses are equally likely to win. The *null hypothesis* is a straw man that you set up to knock down. You test your theory by looking for deviations from the null hypothesis. If those deviations are too large to reasonably be due to random fluctuations, you reject the null hypothesis and accept the alternative, that your theory holds.

If your null hypothesis is that one total should be higher than the other, then the method described in this chapter does not apply. For example, if you are comparing the inside horse with all other horses in the race, the usual situation is for the inside horse to win its fair share of races, but that fair share is not 50%. Only if the fair share is 50% does this chapter apply.

Suppose instead of two totals you have two estimates, each with a standard error. This problem was addressed in chapter 9.

Suppose you notice more winners coming from the inside half of the field than from the outside half. This could be a random occurrence, or it could mean a bias in the racing strip. The greater the excess of inside winners over outside winners, compared to the total number of races you have in your sample, the more likely you will be to reject the null hypothesis and conclude that the imbalance has a cause, such as a bias.

A standard procedure is to see whether you can reject the null hypothesis at the 5% level of significance. This means testing to see if results as wild as ours occur by chance only 5% of the time or less. If you do a large number of such tests on data that are distributed randomly, one test out of twenty will detect random fluctuations this large. Thus even if you reject the null

hypothesis by this test, there is a chance that you are looking at a random fluke.

If you have discovered an imbalance between two totals that is not a random fluctuation, gathering more and more data should yield results that deviate more and more from the minimum needed for statistical significance at the 5% level.

TESTING THE NULL HYPOTHESIS

First, add up the two totals to get the sample size. Find the sample size in the first column of table 15. The second and third columns show what you need for significance at the 5% level. The second column shows the maximum for the smaller of the two totals you are comparing, and the third column shows the difference between the two totals. The second and third numbers are related to each other; there is no need to use both of them. If you have significance by looking at the smaller of the two totals, you will also have significance by looking at the difference between the two totals. Table 15 has both to give a choice.

The minimum sample size necessary to get significance with this test is six. A sample of five is not large enough. If you toss five coins in the air, there is one chance in sixteen that they will land all the same, either all heads or all tails. One chance in sixteen is 6.25%. You can't get down to 5% level of significance until the sum of your two sample sizes is at least six, and even then the totals have to be six and zero.

The numbers in table 15 have been calculated according to what mathematicians call a binomial distribution with $p = .5$.

Table 15
5% Level of Significance

<i>Sum of Two Totals</i>	<i>Max for Smaller</i>	<i>Min Difference</i>
6	0	6
7	0	7
8	0	8
9	1	7
10	1	8
11	1	9
12	2	8
13	2	9
14	2	10
15	3	9
16	3	10
17	4	9
18	4	10
19	4	11
20	5	10
21	5	11
22	5	12
23	6	11
24	6	12
25	7	11
26	7	12
27	7	13
28	8	12
29	8	13
30	9	12
31	9	13
32	9	14
33	10	13
34	10	14
35	11	13
40	13	14
45	15	15
50	17	16
55	19	17
60	21	18
65	24	17
70	26	18
75	28	19
80	30	20
85	32	21
90	35	20
95	37	21
100	39	22

For larger sample sizes than are shown in table 15, here is the formula used to calculate the minimum required differences between two sample sizes required to reject the null hypothesis: double the square root of the total sample size. To find the maximum size for the smaller total, subtract the minimum required difference from the total sample size and divide by two.

EXAMPLES

Example 1. In one day of Hollywood Park quarter horse races, in 9 races out of 10 the winner was an outside horse. Is this statistically significant? By table 15, yes. For a sample of 10 total races, table 15 says the maximum the smaller total can be is 1 for significance at the 5% level. Alternatively, there is an excess of 8 outside winners ($9-1 = 8$), and for a sample of size 10, table 15 says a difference of 8 is needed for significance at the 5% level.

Example 2. In December of 1988 in dirt races at Bay Meadows, the inside post won 38 races while the outside post won but 20. The null hypothesis is that the inside and outside horses were equally likely to win. The sum of the two totals is 58. Table 15 does not list a sample size of 58, but it does list 55 and 60. By interpolation if one of the sample totals is 20 or less there is significance at the 5% level. You've got 20, so you're able to reject the hypothesis of no difference between the inside and outside post.

Example 3. In the summer of 1987 the rail at Del Mar was slow for dirt races. Did bettors at the track know it? In the 317 dirt races the favorite started on the outside half of the field 168 times, on the inside half of the field 125 times, and in the middle post 18 times. In the other 6 races, horses in two of those categories were

tied for being the favorite. Comparing the 168 favorites from the outside half of the field with the 125 favorites from the inside half of the field, is this difference significant? Table 15 does not have sample sizes as large as 293, so you have to use the formula. The square root of 293 is 17.1, and if the difference between the two totals is more than double that, you've got significance at the 5% level. The difference between your two totals is 43, which is considerably more than 34.2.

This is the kind of difference you like to see to state confidently that a relationship exists. Confidence is higher the more the results deviate from the minimum needed for significance at the 5% level. You can be extremely confident saying that bettors at the track knew about the bias and were using it to help decide which horses to bet.

GLOSSARY

allowance. In an allowance race, horses are not for sale. A set of conditions (restrictions on age, sex, number of wins, and so forth) defines the horses eligible to race.

also eligible. Generally there is a maximum number of horses that are allowed to run in a race. The race fills on a first-come, first-served basis. A horse entered after the field is full is treated as an alternate, and may be allowed to run if one of the original horses is withdrawn early enough. An alternate is called an also eligible.

backstretch. The backstretch is the straight part of the far side of the track. After the backstretch comes the final turn and then the homestretch.

beaten lengths. A length is the length of a horse, or about eight feet. Beaten lengths means how many lengths a horse finished behind the winner. A widely-used approximation is each five beaten lengths equals one second.

betting interest. A betting interest is a horse or group of horses you can bet on as a unit. Generally a

betting interest is an individual horse. In the cases of an entry and a field, a betting interest consists of more than one horse.

bias. If a horse is more likely to win if it runs on one part of the running surface rather than on another part, the surface is said to have a bias or be biased. Bias can also describe the way a track favors one running style over another; for example, whether front-runners have an edge.

bleeder. A bleeder is a horse that bleeds during a race or hard workout.

book. To book a bet is to accept a bet and pay it off at odds that do not depend on the amount of the bet, as opposed to a pari-mutuel pool. Bookies book bets. Casino racebooks that are not tied in to pari-mutuel pools book bets. When your bet is booked, you can make a large bet without lowering the odds by the size of your bet.

bounce. After a layoff, sometimes a horse runs an excellent race. If it was overexerted in the process, it may not run as well in its next race. This phenomenon is called bounce.

breakage. When the track calculates the payoffs to the winning tickets, all amounts are rounded down to the nearest ten or twenty cents per \$2 bet. The nearest twenty cents is more common. The money the track makes due to this rounding is called breakage.

call. The calls (first, second, stretch) are points in the race at which the position of each horse, in relation to the race leader, is recorded.

chart. A chart is a race writeup that tells the position of every horse at various points in the race and

comments on how each horse ran, particularly things that may have affected the race's outcome.

cheap. In this book, a cheap race is one with a claiming price lower than the purses offered for maiden special weights races at Golden Gate Fields.

claimer. A claimer is a horse entered in a claiming race.

claiming race. In a claiming race, all the horses are for sale for a known price. This effectively assures races between horses that are close to equal in ability. The time for claiming a horse is before the race starts. Whatever money the horse wins in this race belongs to the previous owner, not the new owner. But if the horse drops dead during the race, the carcass belongs to the new owner.

class. Class means innate potential. The horse with the most class in the race is the horse that would win if each horse in the race ran its best race.

closer. A horse that typically drops back early in the race and then charges up from behind is called a closer.

clubhouse turn. The curve immediately after the finish line is called the clubhouse turn. The other curve is called the final turn.

colt. A colt is an uncastrated male aged four or less. At age five a colt becomes a horse.

daily double. The daily double is a two-race bet. You must pick the winners of both races to win the bet. Generally it refers to picking the winners of the first two races, but some tracks offer a late daily double also. The bet is still called a daily double even if two such bets are offered in the same day.

declare. To declare a horse is to scratch it, i.e., to withdraw it from the race.

draw in. To draw in is to be listed as an also eligible, and then be selected to race.

early speed. A horse that typically takes the lead in the early part of a race is said to possess early speed.

effective track take. This is the percentage of bets the track actually ends up keeping. It is a combination of the track take and breakage.

entry. If two or more horses in the race are owned by one person, the jointly-owned horses will be combined as an entry. If either horse wins, the bet on the entry wins. Entry horses can start from any post position, but they will have saddle cloth numbers 1, 1A, 1B, etc. If there is another entry in the race, the horses in it will have saddle cloth numbers 2 and 2A.

even money. A horse is even money if the bettors like it so much that they have bet it down to 1:1 odds.

exacta. Also called a perfecta, an exacta is a bet in which you select the first two betting interests in order of finish.

exacta box. This is a way to combine multiple bets on one ticket. An exacta box is all possible exactas on the selected horses. For two horses there are two possible exactas; for three horses there are six possible exactas; for four horses there are twelve possible exactas.

exacta reverse. This is the same as an exacta box for two horses.

exotics. Exotics are any bets other than straight win, place, and show. Common exotics are exactas, quinellas, and daily doubles.

false favorite. The horse made the favorite by the bettors at the track generally is one of the best horses in

the race. A favorite that obviously is not one of the best horses in the race is called a false favorite. Whether the favorite is a false favorite is determined by the information available before the race, and not by whether the horse wins the race.

fast rail. This is a bias in which horses running close to the rail have an edge over horses running away from the rail.

favorite. The favorite is the betting interest in the race with the most money bet on it to win.

field. One meaning of field is all the horses in the race taken as a group. Another meaning of field is horses grouped together as one betting interest when the number of horses in the race exceeds the number on which the track is capable of taking bets. For example the tote board and computers might be set up to handle twelve horses maximum, so if there are fourteen in the race, three long shots will be lumped together as a field bet. Horses in the field can start from any post position, but for betting purposes they have the largest number in the race.

filly. A filly is a female four years old or younger.

first-time starter. A horse that has never raced before.

form. Form means a horse's current ability to run. "Going off form" means today the horse is not capable of running up to its potential.

form slave. This term is new to this book. A form slave is a person who slavishly believes published information about a horse's chances of winning today.

freshen. To freshen a horse is to give it a rest.

furlong. A furlong is 220 yards. Eight furlongs equal one mile.

furosemide. This is the generic name of a medicine commonly given to bleeders. A popular brand of furosemide is Lasix.

garden spot. A horse that runs just behind two horses engaged in a speed duel is said to be running in the garden spot.

gelding. A gelding is an animal that has been castrated. This is sometimes done to colts to settle them down for racing.

homestretch. This is the part of the track between the final curve and the finish.

horse. This word has two meanings. One is the animal you've known since childhood. The other meaning of horse is an uncastrated male five or more years old.

impost. Another word for weight assigned to be carried by the horse.

inquiry. When the INQUIRY light goes on after a race, the reason is the race stewards are investigating how the race was run. If one horse unduly interfered with another horse's ability to run, the errant horse might be disqualified.

jockey. A jockey is an athlete who rides a racehorse.

Lasix. This is a brand of furosemide commonly given to bleeders.

late scratch. A horse scratched after being assigned a post position is a late scratch.

length. Distance between horses in a race traditionally has been measured in lengths of a horse. A length is about eleven feet. A horse that runs at a rate of 55 feet per second is running five lengths per second, and covers a furlong in twelve seconds.

long shot. A long shot is a horse going off at high odds. Most people consider a long shot to be a horse going off at odds of about 6:1 or greater.

maiden. A maiden is a horse that has never won a race. Maidens come in both sexes. Maiden also describes a race restricted to maidens.

maiden claimer. This is a claiming race restricted to maidens.

maiden special weights. This is a race restricted to maidens and in which the horses are not for sale.

mare. A mare is a female five years old or older.

meeting. Most race tracks have races only part of the year. For example, Del Mar has racing for six weeks during August and September. A time during which a track has races is called a meeting.

minus pool. In the United States each track has a minimum required payoff for a winning bet. Generally the minimum is \$2.10 for a winning \$2.00 bet, but some states have a \$2.20 minimum. If the track pays out more money than is taken in on that pool in order to meet its required minimum payoffs, it is said to have suffered a minus pool. (Beware overseas; some places have a minimum payoff of \$2.00 and no minus pools, meaning if your horse wins you break even, and if your horse loses you lose.)

morning line. An employee of the track handicaps each race, and his estimates of the win odds for each horse are known as the morning line. Generally the morning line is available starting early in the morning on the day of the race. If it is available the day before the race, it is still called the morning line. There is more than one line available before the race, For example, racing

newspapers present their own lines, but when you say *the morning line* you mean the one put out by the track.

objection. When the OBJECTION light goes on after a race, the reason is a jockey has objected to the way another jockey rode the race. If the stewards agree that one jockey or horse unduly interfered with another horse's ability to run, the errant horse might be disqualified.

off track. An off track is a track rated anything except fast. The most common off tracks are muddy and sloppy.

overlay. An overlay is an event that has less money bet on its happening than can be justified by the probability of its happening.

pari-mutuel pool. In a pari-mutuel pool, the odds are set by the bettors. The track takes a fixed percentage of wagers off the top, and distributes the remainder to winning ticket holders. If you make a huge bet, your bet will greatly depress the odds on that betting interest. Even a small bet might depress the odds slightly.

past performances. Past performances are a listing of a horse's most recent races. Racing newspapers generally describe the most recent eight to ten races for each horse in the race.

perfecta. Perfecta is another name for exacta, a bet that two betting interests will finish 1-2 in the order specified.

pick nine. This is a bet that involves picking the winners of nine consecutive races.

pick six. This is a bet that involves picking the winners of six consecutive races.

place. In the United States, place is a bet that a betting interest will come in either first or second. In

many other countries, to place is to finish in the top three.

plater. This word is found in old books on handicapping. It means a horse entered in a claiming race.

pool. A pool is the total amount wagered on all the horses in the race for one particular bet. Each pool is handled independently; for example, the win pool is kept separate from the place pool.

post position. Horses start a race abreast, and where a horse starts is its post position. Post positions are numbered consecutively, with number 1 being closest to the rail.

purse. The purse is the total prize money distributed to the winners of the race. A typical distribution is 55% of the purse to the winner, 20% to second, 15% to third, 7.5% to fourth, and 2.5% to fifth.

quinella. A quinella is a bet that two betting interests will finish either 1-2 or 2-1. It is also spelled quiniela.

racing strip. This is the running surface, the path on which the race is run.

rail. The rail is the inside edge of the racing strip.

rate. To rate a horse is to restrain it to keep it from running as fast as it wants to. Left to itself, a horse might want to start out too fast and then quit before running the whole distance of the race; so the jockey rates it.

ridgling. A ridgling is a male with only one testicle.

route. A route is a race of a mile or more.

scratch. When you hear that a horse has been scratched, you cannot presume it was itching. To scratch a horse is to declare it out of the race. Another word for scratch is declare.

shipper. A shipper is a horse that has been brought in from another part of the country.

speed duel. This expression describes two or more horses leading a race and running side by side. Running right next to another horse seems to be more tiring than leading a race while running alone. Frequently both horses involved in a speed duel will tire and be beaten in the stretch.

show. Show is a bet that a betting interest will come in either first, second, or third.

slow rail. This is a bias in which horses running well away from the rail have an edge over horses running close to it.

speed ratings. Speed ratings are index numbers indicating the relative times in which the horses ran their races.

sprint. A sprint is a race of less than one mile.

stalk. A horse that runs just behind the leaders is said to be stalking them.

steward. Track stewards are the officials in charge of running the races.

stretch. Stretch has two dissimilar meanings. It means a straight part of the track, as in backstretch and homestretch. It also means to race at a longer distance than the horse has ever raced before, as in stretching out.

TGTB. This is a term new to this book that describes claimers that have records too good to believe; a TGTB horse has recently raced well against much better horses than it is facing today.

tote board. The tote board, more formally known as the totalizator, is a display of odds a bettor is likely to receive on the various possible bets. It is updated,

generally at one-minute intervals, to reflect all bets up to that instant.

track take. The track take is the percentage the track takes from each pari-mutuel pool before distributing the rest of the pool to the bettors. The track take generally is in the range of 15% to 17% on straight bets to win, place, or show, and 20% to 25% on exotics.

trifecta. This is a bet that three betting interests will finish 1-2-3 in the order specified.

triple. This is a three-race bet. To win, the winners of all three races must be specified. In New York, triple means trifecta.

turf. Turf means grass. Races run on grass courses are called turf races.

underlay. An underlay is an event that has more money bet on its happening than can be justified by the probability of it happening.

variant. The variant or track variant is an index number used to adjust speed ratings to allow for the fact that the racing strip differs from day to day in hardness, wetness, etc. Variants allow comparisons of running times for races run on different days. You don't need variants when using *The Racing Times* because they are already incorporated into its speed ratings.

win. A win bet is a bet that the betting interest will come in first.

win odds. Race tracks express odds as a ratio of winnings to original bet. For example: If a \$2 bet on a horse would return \$6 if the horse wins, which is a 3:1 ratio of payoff to bet, then the win odds would be expressed as 2:1. Another way of looking at it is the \$6 payoff includes \$4 of winnings and \$2 of original bet; division of winnings by original bet yields win odds of 2:1.

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ABOUT THE AUTHOR

Stanford Wong is my nom de plume. I was born in 1943. I've got a BS and an MBA from Oregon State University, and a Ph.D. in finance from Stanford University. I've taught at several universities, most recently in the 1975-76 school year. I've taught statistics, calculus, linear programming, accounting, and a few finance courses. I've always been an intensely competitive game player, and I like to solve puzzles. I consider myself fortunate that I can spend my time doing things I enjoy doing, and that it pays enough to keep rice on the table.