GAMBLERS have learned through experience that games of chance can be run in such a way that a certain percentage favors one side at the expense of the other side. That is, if the game is played a sufficient number of times, the winnings of the favored side are generally near a certain fixed percentage of the total amount of all bets placed by the opponent. The modern gambling casinos take the side of the gambling games which has proved in practice to be favorable. If necessary, the casino alters the rules of the game so that the casino advantage is sufficient to cover expenses and yield a desirable rate of profit on the capital which the owners have invested.

There have been many attempts to overcome the casino advantage. But all of them have the same flaw. The casino always sets a limit to the amount that may be bet. With this in mind, six is the limit, the same percentage of the gross bets which it normally wins, even though a player uses a complicated betting scheme. It was not surprising, therefore, when a player used the mathematical theory of probability, that for most of the standard gambling games no betting scheme can ever be devised that will have the slightest effect upon the casino's long-run advantage. In view of this mathematical proof and the painful experience of millions of gamblers, informed people and uninformed people alike firmly believe that it is impossible to beat any of the modern casino gambling games.

I was well acquainted with these facts, and therefore I did not harbor the belief that gambling in the casinos was a likely way to make money. I was, however, a frequent visitor in Nevada. One Christmastime during school vacation, just before my wife and I left U.C.L.A. to spend a few days in Las Vegas, a professor called my attention to an article in one of the mathematics journals. The article described a strategy for playing blackjack which, as I was informed, had apparently limited the house to the tiny edge of 62 percent. This allows the player an almost even break, so I made up a little card with the strategy on it and brought it along on our trip.

As played in the casinos, blackjack, or twenty-one, involves a dealer employed by the casino and one to six players. After players make their bets, hands of two cards each (hole cards) are dealt to each of the players and to the dealer. The players in turn, and then the dealer, are allowed to draw additional cards. The goal is to get as close to twenty-one as possible without exceeding it. The dealer's strategy is fixed: he must draw to (hit) totals of sixteen or less and may not draw to totals of seventeen or more. Players can draw or not, as they please. They also have the option of doubling down with their hole cards — that is, they can double their bet and draw exactly one more card. The numerical value of cards is ten for all tens and face cards; it is labeled for cards two through nine, and aces may be counted as either one or eleven, as desired. A pair of hole cards with the same numerical value may be split, to form two hands. An additional bet equal to the original one must be placed on the new hand.

Bets are usually paid off at even money. If the player's total exceeds the dealer's, he heart of the game. Thorp's chart for this differentiates between what he calls "soft" hands—hands that contain an ace and are therefore less likely to go over 21 (aces count as either 1 or 11)—and "hard" hands, which contain no ace. For example, when the dealer is showing a nine or ten, a soft hand should draw, even on 13, because the ace in the player's hand can be taken as 11 if necessary (reducing the 19 to 9), whereas in the same circumstances a hard hand should stand at 17. And when the dealer shows a four, five or six, a hard hand should stand at 13 (because with a four, five or six in his hand the dealer has a considerable risk of going bust), whereas a soft hand is advised to draw another card up to 12.

This is Thorp's basic strategy: his full-dress system involves a more complex technique of betting in terms of the number of tens, aces and fives remaining in the deck in relation to the number of cards left in the pack before the next shuffle.

The Small Martingale. Professional gamblers generally take Mathematician Thorp and his computerized charts with a grain of salt. The system players, they say, are always losers because they play on and on, giving the house odds a chance to even up. To the contrary, many professional players use a system, known as the Small Martingale, to double the bet after each losing play, a system that allows them an even edge over their opponents by establishing a bet limit. With a limit of $250, a doubling strategy at 5% would have to be illegal $32 after only nine consecutive losses.

Thorp claims, however, that in Reno and Las Vegas the casino operators took him very seriously indeed after the system began to click. The dealer's most effective strategy is to shuffle between each hand. This destroys Thorp's carefully arrived at calculations. But he says he used it only as a last resort because it slows down the play at the table and hence the overall profit.