ENCYCLOPÉDIE OU *DICTIONNAIRE* RAISONNÉ
DES SCIENCES, DES ARTS ET DES MÉTIERS

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BASSETTE

BASSETTE, a kind of card game which had been formerly much in vogue in France; but it has been forbidden since, & it is no longer in use today. Herein are the principal rules.

In this game, as in that of *pharaon* (*See* **Pharaon**) the banker holds an entire deck composed of 52 cards. He shuffles them, & each of the other players who one names *punters*, set a certain sum on a card chosen at will. The banker turns up the deck, putting it upside-down; so that he sees the card underneath: next he deals all his cards two by two until the end of the deck.

In each couple or cut of cards, the first is for the banker, the second for the punter, that is to say, that if the punter has staked, for example, on a king, & if the first card of a pair is a king, the banker wins all of the money that the punter has staked on his king: but if the king comes on the second card, the punter wins, & the banker is obliged to give to the punter as much money, as the punter has staked on his card.

The first card, that which the banker sees in turning over the deck, is for the banker, as one just said: but he does not take then all the money of the punter, he takes only $\frac{2}{3}$, this is called *faced*.[1]

The last card, which must be for the punter, is null.

When the punter wishes to take a card in the course of the game, it is necessary that the banker reduce the game, so that one shows the first card bare: then if the punter takes a card (which must be different from the first) the first card which the banker will draw will be null for this punter; if it comes second, it will be faced for the banker; if it comes in sequence, it will be a pure gain or a pure loss for the banker, according as it will be the first or the second of a cut.

M. Sauveur has given in the *Journal des Sçavans* 1679, six tables, by which one is able to see the advantage of the banker in this game. M. Jacques Bernoulli has given in his *Ars Conjectandi* the analysis of these tables, which he proves to be not entirely correct. M. de Montmort, in his *Essai d'analyse sur les jeux de hasard*, has also calculated the advantage to the banker in this game. One is able therefore to teach oneself thoroughly on this matter in the works which we just cited: but in order to give below some color to our lectures, we calculate the advantage of the banker in a very simple case.

Date: Volume II, January 1752.
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[1] Translator's note: *Faced*: To bring forth a card which is the same as that on which a player has staked his money.

Suppose that the banker has six cards in his hand, & that the punter takes one of them which is one among these six cards, that is to say in the five covered cards: one asks what is the advantage of the banker.

It is clear (*See* **Alternation** & **Combination**) that the five cards being designated a, b, c, d, e are able to be combined in 120 different ways, that is to say in 5 times 24 ways. We imagine therefore that these 120 arrangements are arranged in five columns of 24 each, in a manner that in the first of these columns a is found in the first place, that in the second let it be b which occupies the first place, c in the third, &c.

Suppose that a is the card of the punter, the column where the letter a occupies the first place, is null for the banker and for the punters.

In each of the four other columns the letter a is found six times in the second place, six times in the third, six times in the fourth & six times in the fifth, that is to say that in supposing A the stake of the punter, there are 24 arrangements which make the banker win $\frac{2}{3}A$, 24 which lose it, that is to say which gives to him $-A$, 24 which make him win, that is to say which give to him A, & 24 finally which are null. This follows the rules of the game explained above.

Now, in order to have the advantage of a player in any game, it is necessary 1. to take all the combinations which are able to make him win, or lose, or which are null, & of which the number is here 120. 2. It is necessary to multiply that which he must win (by regarding the losses as negative gains) by the number of cases, which make him win; add together all these products, & to divide the total by the total number of combinations: *see* **Jeu**, **Pari**; of which the advantage to the banker is here,

$$\frac{24 \times \frac{2}{3}A + 24 \times -A + 24 \times A}{120} = \frac{2}{15}A;$$

that is to say that if the punter has staked, for example, an écu on his card, the advantage of the banker is $\frac{2}{15}$ écu, or 8 sous.

M. de Montmort calculates a little differently the advantage of the banker: but his calculation, although longer than the preceding, returns to the same in the end. He remarks that the stake of the banker being equal to that of the punter, the total money which is on the game, before the fate of it was decided, is $2A$; in the null case, the banker gets back only his stake, & the punter his, thus the banker wins A: in the case where he loses, his gain is 0; in the faced case, he gets back $A + \frac{2}{3}A$; in the case which is pure gain, he gets back $2A$; thus the total lot of the banker, or that which he is able to expect to get back of the sum $2A$ is

$$\frac{24 \times A + 24 \times \frac{2}{3}A + 24 \times 0A + 24 \times 2A + 24 \times A}{120} = A + \frac{2}{15}A;$$

& as he has staked A to the game; it follows that $\frac{2}{15}A$ is that which he is able to expect to win, or his advantage. *See* **Avantage**.

M. de Montmort examines next the advantage of the banker when the card of the punter is found, two, or three, or four times, &c. in the cards which he holds. But this is a detail that it is necessary to see in his same book. This matter is also treated with great exactitude in the work of M. Bernoulli that we have cited.

In this game, says M. de Montmort, as in that of pharaon, the greatest advantage of the banker, is when the punter takes a card which has not passed, & his least advantage when the punter takes one of them which has passed two times. *See* **Pharaon**; his advantage is also greater, when the card of the punter has passed three times, than when it has passed only one time.

M. de Montmort finds again that the advantage of the banker in this game is less than in *pharaon*; he adds that if the faced cards paid only the half of the wager of the punter, then the advantage of the banker would be much less considerable; & he says to have found, that the banker will have disadvantage if the faced cards paid only the third. (*M. d'Alembert*)