where the random variables ξ_2 and ξ_3 are defined on the probability spaces $(\Omega, \Sigma, P_{A_C})$ and $(\Omega, \Sigma, P_{B_C})$, respectively,

$$\xi_1(\omega) = \xi_2^C(\omega) = \xi_3^C(\omega), \qquad \omega \in \Omega.$$

By means of f_2^C, f_3^C, f_2 and f_3, we can also determine the shifts between the duplicates in chronologically incorrect lists. However, those determined by the system of chapter duplicates in C can be found from f_2^C and f_3^C with the help of the machinery described in Item 3, whereas the duplicates themselves may not belong to C. Investigating f_2^C or f_3^C for different C, we can study the shift structure in more detail (certain examples of f_2^C for list П of the popes, list H of their nationalities, list B of biblical names and list M of parallel biblical passages are shown in Figs. 77–78, 81–83).

9. The card-deck problem and chronology. Here, we discuss the problem modelling the mechanism of how incorrect chronology is formed by giving the example of card shuffling. Nothing prevents us from assuming that a deck is shuffled in the same manner as the duplicates in chronologically incorrect lists. Note that the problem is not well posed but only restates the initial one in simpler terms, and is the principal basis for working out the methods under consideration.

Suppose there were originally several decks of cards, identical in composition and (unknown) order P_0. Assume that the cards were then put in one large deck F and shuffled, obtaining a new order P_1. Suppose that the "traces" of the initial order P_0 are retained in F, i.e., the shuffling is "incomplete", and that the number of the original decks (and their volumes) is unknown, only assuming it to be considerably less than the volumes. How can we learn for a certain P_0 whether or not the deck F with order P_1 was obtained by the same method, and what the initial order P_0 was?

The natural approach is the search of similar pieces in F. The more similar pieces are found, the more assuredly we can assert that a particular piece preserves the influence of P_0. Thus, we can attempt to restore P_0 piecewise. Besides, by investigating in F the mutual disposition of similar pieces, we can determine whether or not the order P_1 is obtained, on the basis of inserting several decks with order P_0 that are somehow shifted relative to each other, as is always done in shuffling, and also find the shift values. We should, therefore, construct the frequency histogram for the "distances" between the similar pieces and see if there are *typical* ones. If such values are there, and the histogram does possess sharp splashes, then they can be naturally regarded as the shifts between the portions influenced by P_0.

The simplest piece is two consecutive cards. If F was, in fact, obtained by means of the described mechanism, then we can expect a considerable number of nearby cards in the final deck to be neighbouring also in the original ones. Therefore, the frequency histogram for scatterings between the cards which were placed side by side in F should at least once make splashes around the values of the typical shifts between the "duplicates".

An argument of this sort leads to the study of the frequency histograms for names related in chronological lists. Similarly, we can also model the methods considered below.