Briefe über die Wahrscheinlichkeit, by Alfred Rényi. 94 pages. (Translated from Hungarian by Béla Lay and Ludwig Boll with the cooperation of Anna Lange.) Birkhäuser, Basel, 1969. S.Fr. 17.

With this enjoyable little book the author intends to interest the reader in the foundations of probability theory. Blaise Pascal, in a 1654 report to the Paris Academy mentions an article of his about a new, as yet totally unexplored subject, "The Geometry of Chance" (aleae Geometria). In a foreword the reader is led to believe that a Professor Henri Trouverien (the name is a give away) has found four letters from Pascal to Fermat, explaining this theory. Fermat's answers have been lost, but fortunately Pascal seems to have foreseen the possibility of such a loss and summarizes enough of Fermat's reactions to give us an adequate indication of their contents. Rényi has with great pleasure undertaken to publish Pascal's letters.

The first letter discusses the value of assigning a "probability" to an uncertain event (such as throwing a certain number of eyes with a die) and gives the fundamental rules for such probabilities. "Laplace's definition" is borrowed as a rule for computing probabilities in simple cases: the probability of an event is the number of outcomes favorable to the event, divided by the number of all possible outcomes. The addition and multiplication rule for probabilities are given. The second letter first refutes Fermat's objection that Laplace's definition may be circular and then it considers the question how to determine probabilities not covered by Laplace's definition, e.g. the probability of throwing a certain number of eyes with an unfair die. The "frequentist's" answer is given: the probability of an event approximately equals the relative frequency of the event in a large number of trials. In the third letter the multiplication rule is made more precise and independence and conditional probabilities are introduced. The last letter, more philosophical in nature than the previous three, deals with the nature of "probability". It is written in the form of a dialogue between Miton, who takes the "subjectivist's" point of view and Pascal (=Rényi) on the "objectivists" side.

As in Rényi's other well-known didactic work, Dialogues on Mathematics, the unusual form of the book is well suited to keep the readers attention. Of course Rényi's style is a major ingredient. The arguments are not new, but all the major questions are brought up in a logical way and understandable to the intelligent layman. The answers may be too summary for a person who runs into the questions for the first time here, but precisely this aspect will challenge him to think and read more about the tricky and fascinating foundations of probability in which "at almost every step there lurks an abyss for the intruder". The pedagogical value of the book is further enhanced by short historical appendices.

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