of probability theory. Today, games of chance are used to isolate in pure form the logical structures underlying real-life systems while games of skill provide testing grounds for the study of multistage decision processes in practical contexts. We can readily confirm A. M. Turing's conviction that games constitute an ideal model system leading toward the development of machine intelligence.

It is also intended that a unified and complete theory be advanced. Thus it is necessary to establish formally the fundamental principles underlying the phenomena of gambling before citing examples illustrating their behavior. A majority of the requisite mathematical exposition for this goal has been elaborated and is available in the technical literature. Where deficiencies have prevented a comprehensive treatment, we have attempted to achieve the necessary developments. Mostly, however, this book constitutes a consolidation of knowledge found only in widely scattered sources.

The broad mathematical disciplines associated with the theory of

genuflections before the deities of the crap table. Such noumena cast small shadows on the real axis.

In the real world there is no "easy way" to assure a financial profit at the recognized games of chance or skill (if there were, the rules of play would soon be changed). An effort to understand the mathematics pertinent to each game, however, can produce a highly gratifying result. At least, it is gratifying to rationalize that we would rather lose intelligently than win ignorantly.

As with virtually all technical material, this book was not written in a vacuum. Much appreciation is due those who contributed both sym-

tion growth, natural and

Mortality. John de Witt analyzed the problem of annuities, and Edmund Halley published the first complete mortality tables.† By mathematical standards, however, none of these works can qualify as first-class achievements.

More important for the advancement of probabilistic comprehension was the destructive scepticism that arose during the Renaissance and Reformation. The doctrine of certainty in science, philosophy, and theology was severely attacked. In England, William Chillingworth promoted the view that man is unable to find absolutely certain religious knowledge. Rather, he asserted, a limited certitude based on common sense should be accepted by all reasonable men. Chillingworth's theme was later applied to scientific theory and practice by Glanville, Boyle, and Newton, and given a philosophical exposition by Locke.

Turning into the eighteenth century, the "Age of Reason" irrupted and the appeal of probability theory again attracted qualified mathematicians.

Bernoulli developed the