## 2003/7/10

*The meaning of "never."* It has been said<sup>\*</sup> that "six monkeys, set to strum unintelligently on typewriters for millions of years, would be bound in time to write all the books in the British Museum." This statement is nonsense, for it gives a misleading conclusion about very, very large numbers.

(1) Could all the monkeys\*\* in the world have typed out a single specified book (say Hamlet) in the age of the universe<sup>\*\*\*</sup>?

(2) Could all the monkeys in the world have typed out the sentences in this problem in the age of the universe?

(3) If the average lifetime of human being is  $10^9$  s and the total number of lives in the history is  $10^{11}$ . The cumulative number of man-seconds is  $10^{20}$ . Could all the human being in the history of mankind have typed out a single specified book simply by arbitrary work?

\*J. Jeans, Mysterious universe, Cambridge University Press, 1930, P.4. The statement is attributed to Huxley.

\*\* The number of monkeys is an arbitrary choice. We can assume the number is about three times greater than the present population of the earth. Then  $10^{10}$  monkeys are assumed to have been seated at typewriters throughout the age of the universe.

\*\*\* The age of universe is  $10^{18}$ s.