

19th November, 1951.

Dear Monsieur Frechet,

I have tried to check up on the reference you give to my writings and I think now that it must be Vol. XXVI, page 528 to which you wish to refer me rather than page 258 as appears in your letter. I still feel somewhat strongly that, as I said at that time, "it is not to be lightly supposed that men of the mental calibre of Laplace and Gauss ... would fall into error on a question of prime theoretical importance without an uncommonly good reason." The reason, to which later in this paper I ascribe the contradictions which are historically unmistakable, is the assumption that uncertain inference of all kinds irrespective of the logical situation in which it is attempted, can be adequately expressed in terms of the single concept of mathematical probability.

I should submit for your consideration now, that if it were indeed true that this single concept were adequate for all purposes we should confidently expect that definitions of probability should have become more exact and better understood with the progress and study of this subject. In a recent and not uninteresting book, however, (*Probability and the Weighing of Evidence*, by I.J. Good) five very distinct meanings of the word "probability" are found necessary for the discussion.

The procedure which I have preferred in face of a situation of this kind is to choose the oldest clear and useful

definition that I could find, namely that of Bayes, based on, and appropriate to, expectations in games of chance, and in the case of other concepts distinct from this, yet which may seem sufficiently analogous to cause confusion or which are equally relevant in processes of inductive inference, I have preferred to seek for distinct appropriate names, of which "likelihood" and "quantity of information" may serve as examples.

The passage of Laplace to which you kindly draw my attention is one which I had occasion to quote some years ago in addressing the Tercentenary Conference at Harvard. I think it does show that Laplace was not prepared to appreciate the caution and scepticism which actually prevented Bayes from publishing his treatise during his lifetime. It was, as you know, published posthumously at the instigation<sup>ance</sup> of his friends.

Yours sincerely,