SOME THOUGHTS ON STATISTICAL INFERENCE[1]

By E. S. Pearson

University College, London

1. Introduction. A few weeks ago, before leaving England, I found some notes of various talks which I had given on a visit to the United States paid 30 years ago. In a lecture which I delivered here, at Cornell, in early May 1931 I seem to have used some words which it is perhaps rather bold of me to quote today before a Meeting of the Institute of Mathematical Statistics. Still, I will do it because I suppose that after all I am the same kind of person now as I was then! I used words like these: "I sometimes think that Statistics is becoming far too mathematical, and that it is a relief to turn to the many simple, unsolved problems which can be discussed in terms only of means and standard deviations."

It is evident from the context that the problems I was thinking of were concerned with what I might call the philosophy of statistical inference, whose principles and relationships can often be discussed most clearly in terms of simple situations. When I was here in 1931 the work of Neyman and myself was in an early stage; we spoke of the class of admissible alternative hypotheses and we were deriving tests using the likelihood ratio principle. But the idea of the power function and of the uniformly most powerful test was still in embryo, coming to birth at meetings contrived here or there in Europe or in correspondence carried on between Warsaw and London.

I must confess that the older I get, the more difficult I find it to be positive in this matter of statistical inference, but I have felt that as you have invited me to address you here on what is nearly the 30th anniversary of an earlier visit, I should try to formulate some of my thoughts on the relation between the Neyman-Pearson theory and fresh views on inference that are current today. I do this the more readily because I believe rather strongly in the value of emphasising continuity as well as differences in statistical philosophy. I am convinced that if we can only get to the bottom of the way in which similar situations are tackled by different approaches, all I believe lying within the broad path of development of our subject, our understanding will gain in richness—gain in a way which can never happen if we waste energy in trying to establish that we are right and the other fellow is wrong!

2. Some historical reflections on the development of the Neyman-Pearson theory. Allow me therefore to start with a few historical remarks. There is perhaps in current literature a tendency to speak of the Neyman-Pearson contributions as some static system, rather than as part of the historical process of development of thought on statistical theory which is and will always go on.