

21st November, 1955.

My dear Keyfitz,

I was very glad to get your letter of November 18th, and I may say that from other sources I learn that the article has led to a healthy reconsideration of what we are doing in some fields, and I hope it will lead to a recognition of when we are and when we are not attempting to add to natural knowledge.

I think it will be common ground in the technological fields generally that the technologist is constantly concerned with fact finding, or with seeking verification of provisional hypothetical suppositions of the scientific type. In quality control, for example, I imagine that the high level work is all of this kind, involving the whole range of concepts of experimental design, and that only the warning bells and red lights can usefully be mechanized in an automatic acceptance procedure.

What is particularly troublesome is that Neyman in importing from Eastern Europe his misconceptions as to the nature of scientific research, should have chosen so ubiquitous a scientific tool as the test of significance as the subject on which to fasten ideas relevant only to the acceptance procedure. A

typical test of significance is based on a probability statement derived from the hypothesis to be tested, and therefore existing only in the hypothetical world created by this hypothesis. Typically it leads to no probability statement in the real world, but to a change in the investigator's attitude towards the hypothesis under consideration, for which if we choose to use the word 'rejection', we must remember that the rejection is only provisional, and that our hypothetical calculations have shown that there would be a finite probability of our obtaining the observed level of significance even were the hypothesis true. In fact future observations may later demonstrate, with all the force of which scientific evidence is capable, that it is really true, and that the provisional rejection was due to an exceptional coincidence. Of course we may on occasions take irreversible action on the strength of such evidence, but such a possibility does not at all effect the logical status of the evidence upon which it is based.

Did anyone tell you that I have had a book for some time in the hands of my publishers called "Statistical Methods and Scientific Inference" in which I have to develop a fairly broad logical background for the discussion of the kinds of probability arising in statistical work? I have also sent to the Statistical Society's journal a paper giving a direct demonstration that the

table published by Pearson and Hartley in Biometrika Tables of an attempt by Welch to give an alternative solution to Behrens' problem is grossly in error numerically.

The source of this error is purely and simply a logical misapprehension of the semantics of the word 'probability'. Such errors, none the less, need a certain amount of digging out.

Sincerely yours,