*Chapter 11 notes* ***for Agri-food research***

*Please just take the following from this chapter.*

The following year, in 1935, open warfare then broke out between two non-Bayesian camps, with Ronald Fisher on one side, and Jerzy Neyman and Egon Pearson on the other. The Fisherian approach was based on estimation using the ‘likelihood’ function, which expresses the relative support given to the different parameter values by the data, and hypothesis testing was based on P-values. In contrast, the Neyman–Pearson approach, which as we have seen was known as ‘inductive behaviour’, was very much focused on decision-making: if you decide the true answer is in a 95% confidence interval, then you will be right 95% of the time, and you should control Type I and Type II errors when hypothesis testing.

Spiegelhalter, David. The Art of Statistics (Pelican Books) (p. 336). Penguin Books Ltd. Kindle Edition.

The struggle for statistical ideological supremacy continued after the Second World War, but over time the more standard, non-Bayesian schools have resolved into a pragmatic mix, with experiments generally designed using a Neyman–Pearson approach of Type I and Type II errors, but then analysed from a Fisherian perspective using P-values as measures of evidence. As we have seen in the context of clinical trials, this strange amalgam seems to work fairly well, leading prominent (Bayesian) statistician Jerome Cornfield to remark, ‘the paradox is that a solid structure of permanent value has, nevertheless, emerged, lacking only the firm logical foundation on which it was originally thought to have been built.’9 The purported advantages of conventional statistical methods over Bayesianism include the apparent separation of the evidence in the data from subjective factors; general ease in computation; wide acceptability and established criteria for ‘significance’; availability of software; and existence of robust methods that do not have to make strong assumptions about the shape of distributions. Whereas Bayesian enthusiasts would claim that the very ability to make use of external, and even explicitly subjective, elements is what enables more powerful inferences and predictions to be made. The statistical community used to engage in lengthy vituperative arguments about the foundations of the subject, but now a guarded truce has been called and a more ecumenical approach is the norm, with methods chosen according to the practical context rather than their ideological credentials derived from Fisher, Neyman–Pearson or Bayes. This seems a sensible and pragmatic compromise in an argument that can appear somewhat obscure to non-statisticians. My personal view is that, while they may well disagree about the fundamentals of their subject, reasonable statisticians will generally come to similar conclusions. The problems that arise in statistical science do not generally come from the philosophy underlying the precise methods that are used. Instead, they are more likely to be due to inadequate design, biased data, inappropriate assumptions and, perhaps most important, poor scientific practice. And in the next chapter we shall take a look at this dark side of statistics.fn7

Spiegelhalter, David. The Art of Statistics (Pelican Books) (pp. 336-338). Penguin Books Ltd. Kindle Edition.