compelling reason to restrict ourselves to this particular measure of uncertainty in statistical experiments. Using \( H \) is equivalent to considering a decision problem in which the statistician must choose a density function \( f \) from the class of all densities on \( \Theta \) subject to the loss function

\[
L(\hat{\theta}, f) = -\log f(\hat{\theta}).
\]

The Bayes' decision is then to choose \( f \) to be the statistician's prior (or posterior) density \( p \) and the Bayes' risk \( U(p) \) is just \( H(p) \). The appropriateness of \( H \) in statistics is therefore no greater than the appropriateness of this decision problem.

The discussion in Section 3.4 suggests that it may be useful to partition prior distributions into three types: (i) proper priors, (ii) improper priors which must yield proper posteriors after some fixed number of observations and (iii) improper priors which do not satisfy (ii). In Section 3.4, Jeffreys' prior \( \pi(\theta) \propto \{i(\theta)\}^\frac{1}{2} \) is proper. For the mean of a normal distribution, \( i(\theta) \) is constant, and for the mean of a Poisson distribution, \( i(\theta) = 1/\theta^2 \). In each case, Jeffreys' prior belongs to category (ii). Haldane's prior in Section 3.4 belongs to category (iii).

Two final comments: (1) The rate at which the posterior distribution approaches normality seems to be irrelevant to the reference prior. Thus, at the end of Section 3.3 we could replace \( k \) in \( \sigma^2(\theta)/k \) by any function of \( k \). Is this reasonable? (2) In Definition 1, the reference prior was obtained from the reference posterior. (Can we always obtain one?) But in Section 4, when nuisance parameters are present, the reference posterior is obtained from the reference prior. Is this switch necessary?

Dr A. W. F. Edwards (Gonville & Caius College, Cambridge): The first sentence of the paper contains the fallacy known to logicians as *petitio principii*, the fallacy of taking for granted a premise which is equivalent to the conclusion. For although it might go without saying that the correct use of probability entails coherence, it does not go without saying that the correct medium for statistical inference is probability. This premise is disputed.

Professor D. A. S. Fraser (University of Toronto): In this paper Professor Bernardo offers a thoughtful and comprehensive discussion within the Bayesian commitment. He acknowledges the familiar Bayesian difficulties involving reparameterization effects, marginalization paradoxes and strong inconsistency. He then confronts the prime Bayesian characteristic, that the results depend on the prior distribution. His approach is to seek a reference prior, "little relevant initial information" and to use the corresponding posterior directly or as a reference for other posteriors based on personal priors.

The marginalization paradoxes are avoided by a currently familiar procedure (Wilkinson, 1977), by making a virtue of a failure. The problem of inconsistent posteriors vanishes by having a wealth of priors and a corresponding compound wealth of posteriors. However, the procedure for component parameters does produce interesting and appealing results. It also raises the question as to what a distribution means if most of the probabilities cannot be used. In the extreme, each indicator parameter of a model, as a parameter of interest, could have its own prior and thus its own posterior probability: a prior for each possible posterior probability, conceivably all mutually inconsistent. The discrete example (coin) indicates the possibilities in this direction.

The author—within the Bayesian frame—focuses on the choice of a prior to describe "little relevant information". The difficulties lie in the commitment to the Bayesian frame; for some discussion see Fraser (1974).

Some recent research on information with and for statistical models (with D. Brenner, evolving from Fraser, 1972) leads to a classification of information as categorical, frequency and diffuse. Information can be available that is neither categorical nor frequency; the Bayesian approach makes no allowance for this, with resultant difficulties. Also, the proper classification for no information within a range is pure *categorical*. The Bayesian approach forces a measure on this range; the present paper attempts to minimize the effect.

To someone without a Bayesian commitment this thoughtful paper seems close to an interment of the Bayesian philosophy as an answer to statistics.

Professor S. Geisser (University of Minnesota): Inferential theories directed towards statements about parameters are largely irrelevant except they serve as a vehicle for theorists to beat one another over the head with. However, the notion of a reference prior is useful, not so much for the