Comment: Harold Hotelling's Views on Statistics

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I. ARTICLES ON TEACHING

Two, well known articles of Harold Hotelling, "The teaching of statistics" (1940) and "The place of statistics in the university" (1949), have been reprinted above. Several of us have been asked to comment, but, before so doing, it may be helpful to provide some background for these papers and to note some remarks by the original discussants.

Among the leaders in statistics of the forties were Harold Hotelling, Jerzy Neyman, W. Edwards Deming, Burton H. Camp and S. S. Wilks. In 1940, the first four constituted the Committee on the Teaching of Statistics of the Institute of Mathematical Statistics (IMS) with Hotelling as chairman, while S. S. Wilks was both president of the IMS and editor of its journal, *The Annals of Mathematical Statistics*. Hotelling, as a good committee chairman, had drafted the first of the two articles as a position paper for the committee and presented it at an IMS (and mathematical societies) meeting at Dartmouth College in September 1940, 42 IMS members attending.

Olkin, Ghurye, Hoeffding, Madow and Mann (1960) edited a collection of essays in honor of Hotelling on his sixty-fifth birthday. The one Hotelling paper reprinted in the volume was "The teaching of statistics." Neyman (1960) provided a tribute to Hotelling and, in an attempt to explain "the remarkable growth of research in the theory of statistics," he stated

> "However, two single factors seem to dominate all the others. They are the educational and organizational activity of Hotelling (and of a few others such as S. S. Wilks), marked by an outstanding event in 1940, and the appearance in 1946 of an excellent book by Harald Cramér."

Later in his remarks, Neyman noted in reference to the Dartmouth meeting that "Hotelling's paper was received with enthusiasm and, by a unanimous vote, the audience decided to have it published in the *Annals* as an expression of IMS opinion on the matter."

The outstanding event in 1940 was, of course, the appearance of the Hotelling paper reprinted here. The

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unanimous vote may have occurred at an IMS business meeting when three resolutions drafted by the Committee on the Teaching of Statistics (1940) were adopted.

The history of the second reprinted article above, "The place of statistics in the university" (Hotelling, 1949), is similar to that of the first article. It was prepared by Hotelling, presented at the 1945/46 Berkeley Symposium, and published with comments of discussants in the proceedings of the symposium in 1949. In the meantime, a further report of the IMS Committee on the Teaching of Statistics (1948) appeared in the *Annals*. (Hotelling remained chairman of the committee; Neyman and Camp had been replaced by Walter Bartky, Milton Friedman and Paul Hoel.) Part II of this report was a condensation attributed to Deming and Friedman of Hotelling (1949), while Part I was described as a summary of conclusions.

There are other Hotelling articles relating to the teaching of statistics and his views of the discipline. The interested reader should consult the bibliography provided by Smith (1978). Some brief comments on several of these articles follow. Hotelling (1930) reported on a visit to Britain and on British statistics and statisticians. In his report he ended the speculation of American students on the identity of "Student," ruling out such guesses as E. S. Pearson and the Prince of Wales, and first showed his interest in distributions of standard statistics under nonstandard assumptions, a topic of his own later research and of the present author's dissertation directed by Hotelling. Hotelling's (1941) address to the Indian Statistical Congress, although short, exemplified his command of language and views of statistics:

> "The chaste beauty and intellectual delights of the theory of statistical inference, regarded as the intellectual offspring of mathematics and inductive logic, are known at present only to a few devotees; but this theory is bound in time to receive a wider appreciation and a higher valuation even apart from its practical usefulness in the form of applications.... An essential part of the development of statistics should be a close attention and a high regard for the mathematical and logical foundations. It is only in this way that