DISCUSSION ON PROFESSOR HOTELLING'S PAPER

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THE SITUATION OF STATISTICS as it exists in the American university, so clearly described in Professor Hotelling's paper, cannot be gainsaid. His ultimate solution of the problem with respect to teaching, research, and consultation is a goal not easily attainable, but certainly is one toward which every self-respecting university should strive, in spite of administrative difficulties.

As one interested in the applications of statistical method in the fields of biology, medicine, and public health, I should like to present my concept of statistics for your consideration, as a plausible approach to Professor Hotelling's solution.

Francis Bacon (Novum Organum, Aphorism 95) stated long ago that scientists are either men of experiment or men of dogma. The men of experiment (wrote Bacon) are like ants—they collect and use. The men of dogma resemble spiders, which make cobwebs out of their own substance. But the bee takes a middle course: it gathers its material from the flowers of the garden and transforms and digests that material by a power of its own. Not unlike this process is the true business of philosophy. The philosopher relies not solely on the power of the mind, but takes the matter gathered from natural history in the mechanical experiment and lays it up, not in the memory, whole as he finds it, but in the *understanding*, altered and digested. Therefore from a closer and purer league between these two faculties, the experimental and rational, much may be hoped for.

In seeking to determine the place of statistics in a university, we have become confused because we have lost sight of the fact that the statistic method is a part of the scientific method. Without an appreciation and knowledge of statistics, the experimentalist or social scientist cannot frame his experiment or investigation within appropriate limitation; certainly he cannot adequately test his working hypotheses; and he is incapable of competent generalization.

In other words, experimental and statistical methods are equally important components of the scientific method. But because man is time-bound it seems virtually impossible for one and the same person to be proficient both in theoretical statistics and in one of the physical, biological, or social sciences.

In the occupational summary of what a statistician does, it is implied, although not stated, that the profession of statistics deals with the quantitative techniques of the scientific method. I quote:

> The statistician uses inductive reasoning based on the mathematics of probability, to develop and apply the most effective methods for collecting, tabulating, and interpreting quantitative information. This information may relate to any of a wide variety of fields and may be desired for any of a wide variety of purposes. It may pertain to economic conditions,