FOREWORD

THE RIGHT Honorable Harold Wilson, Prime Minister of Great Britain, in opening the 37th Session of the International Statistical Institute in London, September 4, 1969, said:

> The list of papers for the Session reflects the ever widening range of application of statistical methods. When I joined the Royal Statistical Society the papers read were still mainly on economic and social statistics. Nowadays the papers read before a society like those for your session of the Institute cover many more topics relating to many disciplines. It means, I am afraid, that as statisticians today you help so many people in so many diverse subject fields that none of your clients can see the overall contribution which you as statisticians make together as a whole. As a result your value is not perhaps sufficiently recognized by any one group of the people with whom you deal nor are your great services fully realized by the general public.

Himself a statistician, the Prime Minister understood well these contributions of statistics. He might be interpreted as calling for statisticians to explain what they do.

Warren Weaver, a great expositor of science, discussed why science is not more widely appreciated and issued a similar call in "The Imperfections of Science" (*American Scientist,* 49:113, March 1961):

> What we must do—scientists and non-scientists alike—is close the gap. We must bring science back into life as a human enterprise, an enterprise that has at its core the uncertainty, the flexibility, the subjectivity, the sweet unreasonableness, the dependence upon creativity and faith which permit it, when properly understood, to take its place as a friendly and understanding companion to all the rest of life.

Dr. Weaver has had a lifelong interest in probability and statistics. He was given the first Archives of Science Award for his contribution to public appreciation of science.

In the U.S., too, government representatives want explanations. For example, Craig Hosmer, a House Member of the House and Senate Committee on Atomic Energy, in discussing the funding of science at a technological conference on March 5, 1968, said: "The scientific community should take greater pains to make clear that its efforts contribute directly and indirectly to the public good."

Thus, these and other important men ask scientists to tell the public about their subject and to explain what contribution science makes to society. Their request is easier made than satisfied. This collection of essays on applications of statistics represents one kind of step toward meeting it.

To find the origins of this work, we might turn back to the great change and advance in mathematics education initiated in 1954 when the Commission on Mathematics of the College Entrance Examination Board brought together, for a sustained study of the curriculum, teachers and administrators of mathematics from several sources: secondary schools, teachers' colleges, and colleges and universities. Prior to that gathering, the several groups of teachers had seldom worked together on the problems of the curriculum. That meeting of minds has developed and continued in many directions; one of its long-run consequences was the establishment of the Joint Committee of the American Statistical Association (ASA) and the National Council of Teachers of Mathematics (NCTM) on the Curriculum in Statistics and Probability. By late 1967, such cooperation between school and college teachers was widespread, and it was easy for Donovan Johnson, then President of NCTM, and me, then President of ASA, to set up the Joint Committee to review matters in the teaching of statistics and probability.

Early in its work the Joint Committee decided that it wanted to encourage the teaching of statistics in schools, for statistics is a part of the mathematical sciences that deals with many practical, as well as esoteric, subjects and is especially organized to treat the uncertainties and complexities of life and society. To explain why more statistics needs to be taught, we need to make clearer to the public what sorts of contributions statisticians make to society. In the field of statistics, we are, indeed, responding to the sort of requests quoted above.

When describing work in the mathematical sciences, one must make a major decision as to what level of mathematics to ask of the reader. Although the Joint Committee serves professional organizations whose subject matter is strongly mathematical, we decided to explain statistical ideas and contributions without dwelling on their mathematical aspects. This was a bold stroke, and our authors were surprised that we largely held firm.

The Joint Committee has been extremely fortunate to find so many distinguished scholars willing to participate in this educational project. The authors' reward is almost entirely in their contribution to the appreciation of statistics. We have been fortunate, too, to have Judith Tanur as editor of the collection and hard-working committee members as her staff.

To teachers, I can report that thus far I have used material from about one-third of the essays in classes and in speeches. Adult students seemed to enjoy discussing the data and reading further. We do not, however, regard the book as a textbook. We have had other favorable reports from adults who were not students and who read the articles voluntarily. Perhaps the most heartening report on readability came from one of our authors, whose secretary told him, after finishing the typing of a revision, that she enjoyed it enormously. When asked what she especially liked, she said that she had finally found out what the work of the office was all about.

In a parallel writing effort, the Joint Committee has also produced a series of pamphlets for classroom teaching entitled *Statistics by Example.* Intended for students whose mathematical preparation is modest, these volumes teach statistics by means of real-life examples. That effort differs from this one in that the student learns specific techniques, tools, and concepts by starting from concrete examples. (The publisher is Addison-Wesley, Sand Hill Road, Menlo Park, California 94025.)

Some readers may wish to know how to become statisticians, and others may have the obligation to advise students about career opportunities. The brochure *Careers in Statistics* (obtainable from the American Statistical Association, Suite 640, 806 Fifteenth Street, Washington, D.C. 20005) provides information about the nature of the work and the training required for various statistical specialties.

The Joint Committee appreciated being able to report on its work at ten meetings of the National Council or its affiliates. We also reported to the American Statistical Association at Chicago, Illinois, and Detroit, Michigan; to a conference called by the National Science Foundation at the University of Minnesota; to the International Statistical Institute workshop on teaching statistics at Oisterwijk, Netherlands; and to the international conference on teaching of probability and statistics of the Comprehensive School Mathematics Program at Carbondale, Illinois. I discussed some of the material in one of my Allen T. Craig lectures at the University of Iowa.

In addition, by its existence at Harvard University, National Science Foundation grant GS-2044X2 has considerably facilitated this project without directly supporting it. Much of the work was done during periods while Frederick Mosteller held a Guggenheim Fellowship and while William Kruskal was a National Science Foundation Senior Postdoctoral Fellow at the Center for Advanced Study in the Behavioral Sciences. We have also benefited from a number of courtesies extended by the Russell Sage Foundation and by the Social Science Research Council. Before resigning to take up the tasks of the presidency of the National Council of Teachers of Mathematics, Julius Hlavaty was a member of the Joint Committee and participated in the decision to create this collection. The national offices of ASA and NCTM have been most helpful, as have representatives of our publisher, Holden-Day, Inc.

Finally, we have no monopoly on the task of explaining statistics to the public. We urge others to provide their views on the purposes, the methods, and the results of statistical science.

Frederick Mosteller, Chairman
Joint Committee of ASA–NCTM

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