



September 1985

Issue #10

*A newsletter published three times a year by the American Statistical Association-National Council of Teachers of Mathematics Joint Committee on the Curriculum in Statistics and Probability.*

### WOODROW WILSON SUMMER INSTITUTES IN STATISTICS FOR HIGH SCHOOL TEACHERS

A wide variety of new ideas and old ideas presented in new ways were the topics of the mini institutes on statistics held during the summer of 1985. These institutes were sponsored by the Woodrow Wilson National Fellowship Foundation as a part of an outreach program established to promote the ideas, materials, and methods of presentation developed during the 1984 summer institute on statistics held at Princeton University. The outreach programs, which stress "teachers teaching teachers," were conducted by master teachers from the Princeton Institute. The instructors were Peter Barbella (Edgewood High School, Madison WI), Gail Burrill (Whitnall High School, Greenfield WI), Chris Olson (Washington High School, Cedar Rapids IA), and Murray Siegal (Walton High School, Marietta GA). Sites for these mini institutes included Mount Mary College, Milwaukee WI; George Mason University, Fairfax VA; Grand Valley State University, Allendale MI; State University of New York, Purchase NY; and the Boston Science Museum, Boston MA.

The goal of the institutes was to provide curriculum content that could be used to introduce statistical concepts to secondary students at all levels. The presentations focused on the use and misuse of statistics in society, on applying simple statistical techniques to analyze a set of data, and on providing students with a foundation for further work in the field of statistics. Participants were introduced to the concepts of exploratory data analysis and to the power and use of simulation as a way to introduce many concepts in the secondary curriculum. Queuing experiments and taste tests were conducted as examples of simplified approaches to theoretical concepts. Computers were an integral

part of the presentations, and computer software developed by the master teachers was used in the analysis of data and for the simulations.

Due to the enthusiasm and interest of the participants follow-up activities are being considered at several of the sites. The possibility of continuing the program with institutes at new sites during the summer of 1986 is also being explored. For further information, contact any of the instructors or Ann Pomphrey of the Woodrow Wilson National Fellowship Foundation, Box 642, Princeton NJ 08540.

— Gail Burrill  
Whitnall High School  
Greenfield, WI 53228

### THE SECOND INTERNATIONAL CONFERENCE ON TEACHING STATISTICS Victoria, British Columbia, Canada August 1986

The final announcement for the ICOTS II Conference (August 11-16, 1986) is now available from Tom Lietaer, ICOTS II Conference, University Extension Conference Office, University of Victoria, P.O. Box 1700, Victoria BC, CANADA V8W 2Y2.

This conference promises to be one of the most enjoyable. The program is very wide ranging, and there should be something to interest teachers of statistics at all levels — primary, secondary, undergraduate, and graduate. There are also many events scheduled of a more relaxing and entertaining nature.

The various parts of the program are described below:

1. There will be four plenary speakers: Dr. J. Zidek of the University of British Columbia, Dr. William Kruskal of the University of Chicago, Dr. James Adichie of the University of Nigeria, and Dr. Terry Speed

meetings, etc. depending upon the availability of a lecturer. For more information please write to Jon Kettenring, Bell Communications Research, Room 2A-331, 435 South St., Morristown, New Jersey 07960, or call 201-829-4398.

### LETTERS

Please write to the editor if you would like to share books, articles, ideas, or lessons that have been successful in your classroom.

As the text and computer programs written for the Quantitative Literacy Project (QLP) become more widely distributed, it is expected that a number of teachers and/or students from around the country will write additional computer programs that may be used in conjunction with the existing materials. If you have been involved in some way with the QLP and are interested in having a new program considered for inclusion with existing QLP programs, send a copy of the program(s) on a diskette along with documentation and a complete description of what the program does to:

— Jim Kepner  
Department of Math and  
Computer Science  
St. Cloud State University  
St. Cloud, MN 56301

Jim Kepner is a new member of the ASA/NCTM Joint Committee on the Curriculum in Statistics and Probability, and it is his task to coordinate the efforts of people writing software for the QLP. It is the hope of the committee that a large bank of programs can be created with many people submitting programs. —Ed.

### DON'T LET THIS PASS YOU BY...

... the November 1985 and January 1986 issues of *Student Math Notes*, an insert in the NCTM NEWS BULLETIN published in September, November, January, March, and May. The November issue contains an article by Gail Burrill, "Correlation: What Makes a Perfect Pair?" "Successful Simulation: Approximate Answers to Real Questions" is the title of an article by Albert Shulte which appears in the January edition.

... the September 1985 issue of SCIENCE DIGEST. An interesting and mathematically sound article about the probabilities of being on each square of a Monopoly board at the end of each turn and a satellite article on matrix mathematics are included in this issue of the DIGEST. Did you know that Park Place and Boardwalk are better investments with 3 houses on each property than with 1 hotel on each?

### NEW PUBLICATIONS AND PRODUCTS

Travers, Kenneth, et al.  
**USING STATISTICS**  
Addison-Wesley  
2725 Sand Hill Road  
Menlo Park, CA 94025  
1985, 474 pages, hard cover, \$18.30  
(Teacher's Resource Manual and  
Computer Supplement available)

Most statistics texts are of the "If you've seen one, you've seen them all" genre. Almost exclusively written for collegiate-level study, these textbooks vary little with regard to approach or content and are, except for an occasional palliative cartoon, b-o-r-i-n-g. The authors of **USING STATISTICS** have set out to change all that and have successfully done so. Written with high school students in mind but without disregard for tyros of any age, this statistics text is decidedly d-i-f-f-e-r-e-n-t.

Acting upon their belief that "the skills of data analysis that we begin to teach at this level will probably be needed and used by students for the rest of their lives," Travers, Stout, Swift, and Sextro cleverly lure students to learn the art of reasoning statistically. Statistical ideas are presented in a simplified manner which minimizes symbolism and formulas without jeopardizing the integrity of the fundamental concepts. One of the major thrusts of **USING STATISTICS** is its primary and almost exclusionary use of experimental probabilities rather than theoretical ones. Student solutions are generated by means of a 5-step problem solving strategy which climaxes in a meaningful approximation which is remarkably close to the theoretical answer but which requires no formal work in such areas as binomial probability theory. Students seem to enjoy using models such as random number tables, dice throwing, and coin tossing as they become active participants, rather than passive ones, in the determination of an answer. The knowledge that their approximations will not likely be duplicated by other class members adds an additional dimension of chance to problem solution. Theoretical probabilities are not ignored, however. In fact, students are led to see, in an intuitive fashion, that a theoretical probability can be viewed as a limit of experimental probabilities as the number of trials of the experiment increases.

The authors of **USING STATISTICS** are cognizant of the "drawing power" of varied data sets and have been selective in incorporating all sorts of data types into their examples and exercises. The traditional coin, dice, card,

random walk, and batting average statistics can be found but in the eclectic company of data ensuing from such sources as haircut types, weather reports, introvert/extrovert personalities, airline overbookings, ESP powers, and flaky pie crusts. In addition, students acquire a wide repertoire of techniques for the graphical representation of data sets. Stem-and-leaf plots and box-and-whisker plots as well as the more conventional scatter plots, histograms, and frequency polygons are data illumination tools for student use in formulating tentative conclusions inferred from data.

USING STATISTICS is designed as a text for a one or two semester course in statistics. Chapters treat topics of descriptive statistics, centers and spreads, expected values, probability, samples and populations, correlation and regression, the normal curve, chi-square, errors in measurement, estimating population means, hypothesis testing, and Monte Carlo methods. Utilization of the hand-held calculator and the computer is encouraged but not required for successful usage of the text. The book's appendix contains a listing of several computer programs which remove some of the tedium sometimes generated by the manual solution of repetitive-type problems.

Interesting "Key Problems" introduce each of the 14 chapters. Chapter One begins with an intriguing scenario linking William Shakespeare, Howard Hughes, Alexander Hamilton, John Jay, and James Madison with "anonymously" written documents and the use of statistics to investigate authorship. "Special Interest Features" are employed to maintain the flow of major ideas with applications of statistics to other areas such as health, science, and astronomy. "Project Corners" amplify another major thrust of the text, that students should become participants in the statistical process by collecting and analyzing their own data. "Project Ideas" encourage students to undertake such activities as justifying the moderating effect of large bodies of water on land temperatures and determining whether a telephone directory is an accurate font of random digits. "Helping Hands" with fingers arranged in the "okay" gesture pleasantly highlight important definitions.

Just as the USING STATISTICS textbook is student-oriented, the ancillary materials are teacher-friendly. At its outset, the Teacher's Resource Manual concedes that its primary purpose is to provide instructional guidance, particularly for teachers who have had no extensive experience in teaching statistics. While eschewing the cookbook approach to statistics education, the authors do present some "Recipes

for Success," a collection of hints intended to enhance an instructor's personal teaching style. The Resource Manual also includes a commentary on most of the sections of the text as well as exercise solutions, chapter tests, and a roster of springboard suggestions for student projects.

The Computer Supplement to USING STATISTICS contains a chapter-by-chapter commentary regarding relevant computer programs along with optional programming exercises. A description of the computer software which accompanies the text is also provided. An appendix to the Computer Supplement describes the Nightingale Network, an electronic bulletin board service funded by the Woodrow Wilson National Fellowship Foundation in Princeton, New Jersey. Accessing this vehicle for exchanging interesting data sets is outlined in the supplement.

Travers, Stout, Swift, and Sextro are to be commended for their singleness of purpose in bringing together a statistics package which introduces students to the excitement of statistical investigation while concurrently providing safeguards which prevent them from becoming "missing in action," victims of a barrage of excessive mathematical rigor. For a beginning and meaningful look at the nature of statistical thinking, USING STATISTICS presents students with an intuitive, concrete, fun, and mathematically sound approach to statistics, and in so doing provides a solid foundation for advanced studies in the area.

— Pamela Coffield  
Brookstone School  
Columbus, GA 31995

FOCUS ON STATISTICS  
Woodrow Wilson National Fellowship Foundation  
Box 642  
Princeton, New Jersey 08542  
1985, paperback, \$8.50

Four-week, residential institutes for teachers of high school mathematics, administered by the Woodrow Wilson National Fellowship Foundation, are held on the campus of Princeton University each summer. The 1984 Institute examined statistics and their place in the high school curriculum. Developments in statistics and their application, methods for integrating new material of current and potential relevance, and experimental examples were included. FOCUS ON STATISTICS consists of a series of curricular guides based on the content of last year's Institute. These guides, which were developed by the faculty and participants, include

units on computer applications in statistics, graphing techniques, geometric probability, and informal approaches to the normal distribution, as well as many other topics. They will be available from the Foundation by the end of September, 1985. —Ed.

Page, Warren (Ed.)

AMERICAN PERSPECTIVES ON THE  
FIFTH INTERNATIONAL CONGRESS ON  
MATHEMATICAL EDUCATION (ICME 5)

Mathematical Association of America  
1529 18th Street NW  
Washington, DC 20036  
1985, 134 pages, \$6.50

ICME 5, a quadrennial international mathematics education meeting, took place in Adelaide, Australia, last summer. This report presents the perspectives and reactions of a number of leading American mathematics educators who attended the meeting. The Teaching of Statistics was one of ten topic area study groups at ICME 5, and four major national projects in statistics were presented at the conference. For a more detailed description of the meeting, see "REPORT ON ICME 5" written by Jim Landwehr and Ann Watkins in the January 1985 issue of the newsletter. —Ed.

**HELP!**

This section of the newsletter is for your questions and requests. Please write to the editor if you have any questions of your own. If you help anyone solve a problem, please send a copy of your letter to the editor as there are others who will want the information.

Professor Angelina Martinez and I are working on designing an approach to incorporate statistics into the mathematics curriculum of University High School, a laboratory high school which is part of the University of Puerto Rico.

Through the newsletter we have been able to list some of the materials that would be useful in our project. However, any information concerning curriculum guidelines and materials would be a great help. If you have a list of edited materials, it would be appreciated. Please send them to Prof. Martinez or myself at the address below.

— Professor Sonia Balet  
Institute of Statistics  
University of Puerto Rico  
Rio Piedras Campus  
P.O. Box 21877, UPR Station  
Rio Piedras, PR 00931

I attended the presentation on the Woodrow Wilson Institute for Statistics Teachers at the NCTM National Conference in San Antonio. At that time I discovered The Statistics Teacher Network was available as a source of information for those of us teaching statistics in the high school.

The Mathematics Department at West Linn High School is currently working on an in-depth curriculum revision project which will include the incorporation of a statistics/probability strand throughout the program. At this time we are developing a Statistics-Algebra-Trigonometry course that will provide an alternative to Math Analysis for our college bound students who do not plan to enter the scientific fields. Applications will be emphasized, with a heavy use of the computer as a tool.

Since commercial materials and software are limited, we are seeking suggestions for sources of these. In addition, we are looking for teacher workshops and in-service ideas and materials. We are anxious to locate these as soon as possible. Please let us know if you have or are aware of any quality ideas, materials, or programs that we might be able to use. In return, we will be happy to share any products we develop.

— Linda Foreman  
Mathematics Department  
West Linn High School  
West Linn, Oregon 97068

The staff members of the Quantitative Literacy Project are investigating the possibility of developing videotapes to be used in inservice programs to train teachers to present concepts in statistics and probability.

We would appreciate any information you could provide on making videotapes. We would particularly like input from you about these issues:

1. Do you think the idea of producing videotapes for this purpose has merit, i.e., would you use them?
2. What should be included on such a tape, and what type of format would be most effective?
3. If you know of any good videotapes being used in mathematics education, we would appreciate hearing from you.

Send suggestions, recommendations, or any information you have to:

— Richard L. Scheaffer  
Department of Statistics  
University of Florida, FL 32611