THE STATISTICS TEACHER NETWORK

January 1986 *Issue #11*

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.

SNEAKY STATISTIC OF THE YEAR CONTEST

MATH Magazine, a classroom publication of Scholastic Inc. for general math students in grades 7-9, kicked off its new Charts, Graphs, and Statistics series by announcing the winner of its Sneaky Statistic of the Year Contest in the September 13, 1985 issue. The contest, which was first announced last spring, invited students to send in a graph from a newspaper, magazine article, or advertisement that they considered the "trickiest, sneakiest" graph or chart published during the year. Students were also asked to include an explanation justifying their selection. The purpose of the contest was to help raise awareness among young people about the ways in which statistics can be manipulated to make a particular point or persuade the reader that one product is superior to another. Tricky graphs are often used to present data in a way that catches the reader's attention, holds it, and transmits the desired message.

The graph judged sneakiest by *MATH*'s staff was one sent in by Wendy Hopfensperger, now a ninth grader at Spencer Public School in Spencer, WI. Wendy won the Grand Prize, a copy of the TOP 10 Albums on *Billboard* Magazine's Top Pop Albums chart for the week, and the four runners-up each received the Top Five albums on the chart.

Wendy's graph was part of an advertisement for Chevrolet Cavalier automobiles. The graph had no vertical or horizontal scales and, in fact, no numbers appeared on the graph at all. Yet it claimed to demonstrate how Cavalier sales had "doubled" during the previous year.

The staff of *MATH* was surprised that the contest drew considerably fewer entries than other *MATH* contests and also that many of the students who did enter sent in graphs that weren't sneaky, but rather were confusing to *them*. In many cases, the topics of the graphs were difficult — changing stock prices, housing starts charted over the course of a few years, etc. However, there were a number of entries that we felt were straightforward which obviously were not clear to the students.

The results convinced us that some junior high students find even relatively easy bar, pie, and line graphs difficult to understand. Therefore, we have decided to devote many of the future installments of our new Charts, Graphs, and Statistics series to helping students read these graphs. One of our objectives is to teach our student readers how to interpret graphs with a critical eye as a way to sharpen their analytical skills and improve their judgements. We hope our readers will be on the lookout for examples of misleading statistics that they see in their everyday lives.

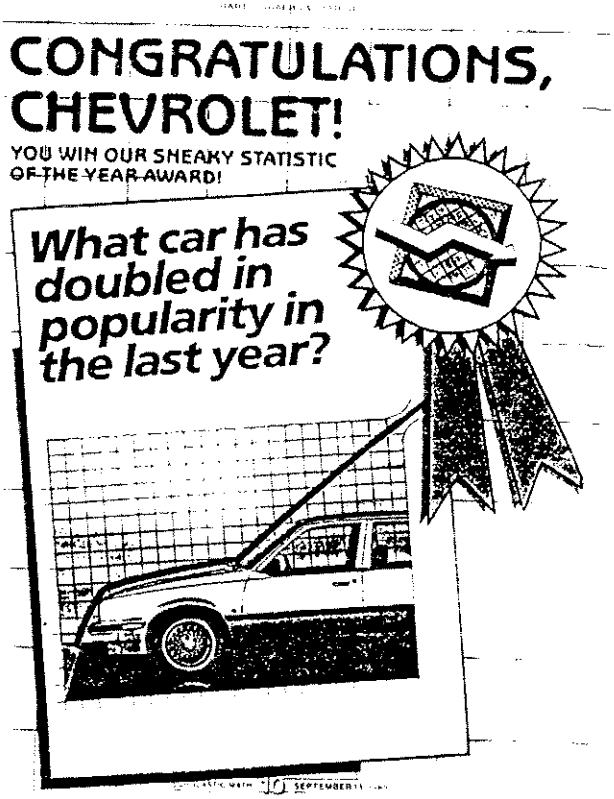
Also planned for this series are:

1. A second Sneaky Statistic of the Year Contest, to be announced in the spring of 1986, with prizes to be awarded by the end of the school year;
2. An interview with a vice president of Harris Polls;
3. Several articles presenting graphs and charts to help illuminate topics and issues about which students are concerned, such as drunk driving, aid to starving nations in Africa, and baseball batting averages;
4. A number of articles which introduce students to basic concepts in probability, tree diagrams, permutations, and combinations.

— Sue Macy
Editor, *MATH* Magazine
Scholastic, Inc.
730 Broadway
New York, NY 10003

(The second Sneaky Statistic Contest will be

open to all *MATH* readers and other interested math students aged 12-15. Only one graph or chart will be allowed per entry. Students must accompany their entries with a brief paragraph justifying their selection. Entries must include the teacher's name, the school address, and the phone number. For further information, contact Sue. —Ed.)



THE SECOND INTERNATIONAL CONFERENCE ON TEACHING STATISTICS
Victoria, British Columbia, Canada
August 11-16, 1986

There are numerous activities on the ICOTS II program that will be of particular interest to teachers of statistics at the pre-college level. For example, one of the 13 Invited Paper Sessions will consider teaching statistics to 12-18 year olds. Among the papers to be presented in this session are:

"A Statistics Course for All Students Aged 11-16"
Peter Holmes — Sheffield, United Kingdom

"How to Teach Statistical Concepts to Slow Learning Students"
A. A. Abele — Heidelberg, West Germany

"Exploratory Data Analysis and the Stochastics Curriculum at the Secondary Level"
R. Beihler — Bielefeld, West Germany

"Using Simulation to Model Real World Problems"
B. Bryan — Augusta, Georgia

"Statistics and Quality, Teaching Material for the Secondary School"
B. Hedman — Sweden

"Using Television Programs to Teach Statistics at the High School Level"
D. Roseveare — BBC, London

Another paper related to television is in the Miscellaneous Session. It is titled "The Making of Statistical Films" and is being presented by D. Lunn and D. Saunders of the Open University and BBC.

There will be many papers given on the use of microcomputers in teaching statistics. We are planning to have demonstration computer labs available where participants and vendors can view and/or demonstrate statistical software.

The session on training teachers will include papers on inservice training, including one by members of the Quantitative Literacy Project.

One of the important, but less well publicized, features of the conference will be the short (10-15 minute) contributed papers. I would urge any reader of this newsletter to present any interesting idea that they might have used in teaching statistics. Already, several high school teachers are planning to present contributed papers. For further information on presenting contributed papers, please write to Bruce Johnson, Department of Mathematics, University of Victoria, Box 1700, Victoria, B.C. V8W 2Y2.

The second announcement was distributed in August and received many enthusiastic comments. Plan to be in Victoria next August and see just how enjoyable statistics teaching can be.

—Jim Swift
RR #3, Site E
Nanaimo, British Columbia, Canada
V9R 5K3

(The final announcement for the ICOTS II Conference may be requested from Tom Lietaer, ICOTS II Conference, University Extension Office, University of Victoria, P.O. Box 1700, Victoria, B.C., CANADA V8W 2Y2. For a more detailed description of the conference, see the report written by Jim in the September 1985 issue of the newsletter. —Ed.)

NEW PROGRAMS

This past summer, I held a workshop on the

use of statistics to enhance the teaching of mathematics in the middle school. Teachers representing the fourteen middle schools in the Cobb County system attended the session.

Most of the workshop was devoted to identifying topics in the middle school math curriculum which would benefit from the application of graphical and computational techniques taken from statistics. This discussion was based on my article "Real World Help for the Middle Grades Mathematics Classroom" which was begun at Princeton in 1984. Copies of the article and *Exploring Data* from the Quantitative Literacy Project were distributed to the participants. After a discussion on the collection of live data, an actual example of a data set was generated by the teachers with each giving his/her years of teaching experience and rating of the theme song from the movie "Eddie and the Cruisers." Using this data, I introduced line plots, stem and leaf plots, box plots, scatter plots, and median fit lines.

The use of a survey as a class project was discussed at length, and the outline I used in the Woodrow Wilson mini-institutes held during summer 1985 was distributed to participants. A brief discussion of sampling and the misuse of statistics followed. The latter topic was illustrated with materials drawn from the mini-institutes.

The response of the participants was positive. Each had given up half a day of pre-planning time to attend, and the feedback was enthusiastic. It should be mentioned that the success of this workshop was due in large part to the leadership and support of Dr. Wanda White, the Math Curriculum Supervisor for our system. She is currently working on a proposal to obtain federal funding to conduct a fifty hour class on the teaching of statistics to middle school math and science teachers. If the project is funded, I will be the instructor for this course. Wanda is also attempting to have each of our eleven high schools identify at least one teacher in the school to teach Quantitative Literacy by the spring of 1987. I and two other instructors piloted this course at Walton High School last spring. We are excited about future opportunities because we can count on strong support from supervisors like Wanda who are committed to increasing the amount of statistics being taught in our schools.

— Murray Siegel
Walton High School
1590 Bill Murdock Road
Marietta, GA 30062

LETTERS

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

I have recently written an article on the Bayesian frequentist interpretation of confidence regions and the notion of small samples in the binomial scheme which I believe could be of interest to the readers of *The Statistics Teacher Network*. This paper has been submitted to the journal, *Computational Statistics and Data Analysis*, but has not yet been published. The following abstract provides some details:

> A notion of Bayesian frequentist interpretation of confidence regions is introduced. Since the relation of this interpretation with confidence coefficients of Bayesian regions is established, it seems that the practical importance of these regions grows. The consequences for the problem of developing a confidence interval for the parameter of a binomial scheme are described. In particular, a new computational procedure for the small sample is proposed.

To obtain a copy of the paper, please send your request to me at the address below.

— Andrzej Matuszewski
Institute of Computer Science
Polish Academy of Sciences
P.O. Box 22
00-901 Warsaw PKiN POLAND

Thirty middle and high school teachers of mathematics participated in the first session of the Indiana Quantitative Literacy Project held in Terre Haute, Indiana, on October 17-19, 1985. Funded by a grant from the Indiana Department of Education to Rose-Hulman Institute of Technology, the project provided instruction in the use of the QLP materials including the computer diskette. Instructors were Gail Burrill, Al Shulte, Martha Hegg, and John Kinney.

The teachers received an assignment to use the materials and to return in April of 1986 prepared to report on their experiences and to share ideas. The next session will be held April 17-18th.

One immediate by-product of the project which has been completed is the translation of the existing QLP diskette for IBM computers and compatibles. Teachers at the first session were enthusiastic. It is hoped that projects such as this will result in a permanent place for the quantitative literacy materials in the curriculum.

— John Kinney
Rose-Hulman Institute of Technology

5500 Wabash Avenue
Terre Haute, IN 47803

DON'T LET THIS PASS YOU BY...

· · · the January 10, 1986 and January 31, 1986 issues of *MATH* Magazine, a publication of Scholastic, Inc. for grades 7-9. Both articles, authored by David Goldman, pertain to topics in statistics which would be interesting and informative to middle school and high school students. "To Life" is the title of the piece which appears in the January 10th issue, and the topic of the article is life expectancy. The subject of the report in the January 31st issue is smoking and health. It introduces the concept of statistical inference in the context of an experiment in which claims made by the tobacco industry are analyzed using data compiled by the American Cancer Society.

· · · issue Number 4 of *Random News*, the newsletter of the Centre for Statistical Education. The article, "Practical Work in A-Level Statistics" describes a two year project to be funded by the Department of Education and Science, directed by Peter Holmes, and based at the Centre. One of the objectives of the project is to produce, test, and validate a package of materials to help teach statistics to 16-18 year olds using a practical approach.

To subscribe to *Random News*, write to Peter Holmes, Director, Centre for Statistical Education, 25 Broomgrove Road, Sheffield S10 2NA, United Kingdom. There is currently no charge. —Ed.

NEW PUBLICATIONS AND PRODUCTS

Tufte, Edward R.
THE VISUAL DISPLAY OF QUANTITATIVE INFORMATION
Graphics Press
Cheshire, CT
1983, 197 pages, $32.00

THE VISUAL DISPLAY OF QUANTITATIVE INFORMATION is a beautiful book on effective graphics. The first chapter, and perhaps the most interesting, is a review of excellence in graphics over the last two centuries. We are shown graphs that depict with astonishing clarity the cancer rates across the United States, the loss of men Napoleon suffered in the Russian campaign, and New York City's weather for 1980, for example. These graphs give to the viewer — "the greatest number of ideas in the shortest time with the least ink in the smallest space." They are also aesthetically of high quality. Students who plan careers in commercial art or illustration should see these examples.

The second chapter is a collection of graphs that distort the data. Some of these also da back two hundred years.

In the second half of the book, Tufte points out the factors that make graphs successful. He advocates the elimination of "chartjunk" — all of the extra ink that does not communicate information to the viewer. The goal is to have the highest possible data to ink ratio.

THE VISUAL DISPLAY OF QUANTITATIVE DATA may be the first "coffee table" book about statistics. It is a pleasure to pick up and browse through.

— Ann Watkins
Los Angeles Pierce College
Woodland Hills, CA

MODEL CURRICULUM STANDARDS: GRADES 9-12
California State Department of Education
P.O. Box 271
Sacramento, CA 95802-0271
1985, 320 pages, $5.50

According to California's superintendent of public instruction, this new guide to high schoo curriculum "portrays a vision of the type of high school program that *should* be available for all students." The publication, as the title indicates, is intended as a model — not a mandate. There are six major areas of study covered including mathematics and statistics. (A request from Al Shulte for information on state curriculum guidelines in statistics and probability appeared in the September 1985 issue of the newsletter. The topic of curriculum standards is one of critical importance, and input is needed from educators so that this issue may be addressed effectively.) —Ed.

QUANTITATIVE LITERACY PUBLICATIONS
Dale Seymour Publications
P.O. Box 10888
Palo Alto, CA 94303
1986

The Quantitative Literacy Project, which is a joint project of the American Statistical Association and the National Council of Teachers of Mathematics that is partially funded by NSF, has produced four booklets for classroom use in the teaching of statistics and probability. By title, these are *Exploring Data*, *Exploring Probability*, *The Art and Techniques of Simulation*, and *Exploring Surveys — Information from Samples*.

The booklets are being published by Dale Seymour Publications, and all should be available by late summer of 1986. They will be produced sequentially in the order given above. Hopefully, *Exploring Data* will be available by April. If you are interested in ordering any of these booklets, the 1986 Dale Seymour catalogs will provide further details.

Each booklet will have a teacher's manual, which will be an expanded version of the student's booklet containing answers, marginal notes on important points, and suggestions on how to use the book.

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

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.

Bob Hogg, Chair of the ICOTS II Program Committee, and Bruce Johnson, Organizer of Contributed Papers, have asked me to arrange a Contributed Papers Session on the History of Teaching Statistics (HOTS). I would appreciate hearing from anybody interested in taking part in this session.

What I have in mind are contributions from a variety of countries, such as Germany, Holland, Japan, Hungary, USA, Canada, and other countries or regions where there were particularly early or interesting developments in the teaching of statistics. Each contributor will be asked to address questions such as the following:

- When was statistics first taught in country X at the school/university/other level? When was this first recognized by name in the curriculum or in job titles?
- What form did this early teaching take? Who were the students? Who were the teachers? When did examinations start?
- What were subsequent developments, and why did they occur? What international contacts were there? (I suggest 1939 as an ending date.)

In this way, via a series of country case studies, we may build up a synoptic world-wide historical view. From my own experience of examining developments in the United Kingdom, I know that considerable original research may be required. I have some "leads" in most of the countries listed above and will be glad to assist you wherever I can. It is virtually impossible to carry out detailed research outside the country of origin.

If you are interested in contributing to the session described above, I should be grateful if you would inform me. If you prefer, you may return a completed ICOTS II Abstract Form to the address on the form before May 31, 1986. If I can assist by providing documentation to support funding requests, or in any other way, please do not hesitate to let me know.

— John Bibby
Centre for Educational Sociology
7 Buccleuch Place
Edinburgh, Scotland

(For further information and addresses concerning ICOTS II, see the second article in this issue of the newsletter. —Ed.)

CALENDAR

NCTM Regional Conference Programming

Upcoming NCTM regional conferences are scheduled as follows:

Dallas, Texas
27 February - 1 March 1986

Salt Lake City, Utah
6-8 March 1986

National Council of Teachers of Mathematics 64th Annual Meeting

The NCTM Annual Meeting in Washington, D.C. on April 2-5, 1986 will include 20 sessions involving probability or statistics. In 12 of these sessions, techniques in probability or statistics represent the main topics of the presentation or are covered extensively in the talk. In the remaining 8 sessions, statistics and probability are used indirectly in the framework of the presentation or as part of the discussion. Specific section numbers have not been assigned as yet. The ASA-NCTM Joint Committee on the Curriculum in Statistics and Probability will have a booth in the commercial exhibits hall. Come by and meet other teachers interested in improving statistical education in elementary and secondary schools, share your ideas with committee members, and let us know how we can help you.

WHERE TO WRITE

Address all letters, announcements, questions, articles being submitted for publication, and requests to get on or off of the mailing list to the editor:

— Beth Bryan
Department of Mathematics and
Computer Science
Augusta College
Augusta, GA 30910