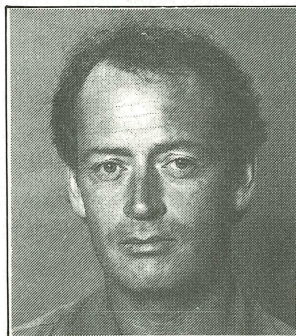


Alastair Scott



Peter Mullins

New Zealand Statistical Association Joins the Northward Drift

For forty years, the President and Secretary of NZSA have been resident in Wellington. This year introduces a break with tradition as the President for 1988/89 is Alastair Scott and the Secretary is Peter Mullins, both of Auckland. Informed sources are adamant that no significance should be placed on the symbolism of forty years nor snide remarks made about the landscape around the capital. The changes have been introduced to reflect the geographical nature of the Association as a national body.

The northern push by Scott and his intrepid band has coincided with Auckland volunteering to host the annual conference in August with Chris Triggs in the hot seat.

The Association is in great heart and flourishing after the careful nurturing it received in recent years from Peter Thomson and his merry and hardworking band of followers.

This will be an important year for our organisation and we wish the members of committees and subcommittees the best of luck, backed up by our support as needed.

The Nitty Gritty on our New President.....

Alastair Scott
Department of Mathematics and Statistics
University of Auckland,
Private Bag,
Auckland.
Telephone: (09) 737-999 (Ext 8751)
E-Mail: MAT-SCOTT @ AUKUNI.AC.NZ

Alastair is a Professor of Statistics at the University of Auckland. His university training was at Auckland and the University of Chicago, with a year at the Applied Maths Division of the D.S.I.R. sandwiched between the two. He has taught at the London School of Economics (1965-1972) and has held visiting positions at Bell Laboratories, Argonne National Laboratory, the Universities of North Carolina, Wisconsin, California at Berkeley, Southampton, Carleton and Australian National University. His research interests lie in Sample Survey Theory and Methods, and Biostatistics.

In This Issue:

- *What Statisticians Do*
- *Statistical Software Reviews*
- *Education Committee Report*
- *News from Members*

PRESIDENT'S COLUMN

The activities of the NZSA have been steadily decentralised over the last few years, starting with the annual conference and continuing with the editorships of both the newsletter and the NZ Statistician. Now it is the turn for the presidency and a substantial part of the Executive Committee to move away from Wellington, at least for a time.

The NZSA has always held a special place in my affections because of the fond belief that I could enjoy all the benefits of membership without ever getting landed with a job. Now that this has gone the way that many other cosy assumptions have gone in recent years, I am starting to realise how much the rest of us owe to people in Wellington and to the hidden subsidies carried by their employers. It is clearly time that the rest of us started doing our share of the work.

If one has to get landed with a job, this seems a pretty good one to choose. Peter Thomson and the outgoing Executive Committee have left a very smoothly-running organisation with a nefficient committee structure. Peter has done a great job as president and we wish him well for his leave in Japan. I am very grateful to Jean Thompson who, although stepping down as secretary, is staying on the Executive Committee to help with the transition, to Sharleen Forbes and John Rayner who have agreed to stay on as convenors of the Education and Publication Committees respectively, and to Alex Nield who as agreed to act as Treasurer for one more term. We have not yet held a meeting of the now widely dispersed Executive Committee but we are determined that the tradition of minimal expenditure on administration will be continued.

This year's annual conference at Massey was an

enormous success and we all owe a debt of gratitude to Dick Brook and his fellow workers. The team even turned on perfect weather for the duration of the conference and the conference dinner was certainly a unique experience. The conference will be held in Auckland next year and is tentatively scheduled for 16-18 August. Chris Triggs from the Applied Maths Division of DSIR, will head the organising committee and would be pleased to hear suggestions for topics or speakers.

Congratulations to Jocelyn Dale on the birth of her son. Jocelyn and baby are both well and planning for the next issue of the next issue of the NZ Statistician is well under way. Dick Brook is continuing as editor of the newsletter for the next year but would like to phase out his involvement gradually. Any volunteers?

There are two busy years in prospect for the statistical community in New Zealand. The Fourth International Meeting on Statistical Climatology will be held in Rotorua from 27-31 March, 1989. Details of the programme can be obtained from John Revfeim at the NZ Meteorological Service. Then we have ICOTS 3 coming up in Dunedin in August 1990. Both meetings will draw a large number of distinguished international visitors to New Zealand.

Finally, it is sad to record the demise of the Deming Institute which has done a great deal to alert NZ industry to the potential usefulness of statistical ideas. The winding up of the Institute is a setback to our profession and it is important that we continue the main thrust of its work through other institutions.

Alastair Scott

PETER MULLINS, Incoming Secretary of NZASA

Born in Te-Kuiti in 1948, I trace my early statistical leanings directly to the well-known King Country group, whose most popular result is the famous observation on extreme values, that the maximum number of tanalised poles that can comfortably be carried up a King Country farm slope seems to be about four or five.

Some years passed, and I eventually found employment as a consulting statistician in the University of Auckland, first in the Department of Zoology, then Obstetrics and Gynaecology, then Community Health, and finally as a part-time temporary flunky in the Department of Maths and Stats. The time that I don't spend grappling with the problems of teaching statistical methods to 150 second-year students I spend trying to earn enough from 'outside' consulting to support the lifestyle to which I wish to become accustomed.

My current concerns, apart from the obvious ones relating to short and long-term survival, have mostly to do with the commercial success of others in my chosen profession. I hope to do something in the next couple of years to raise the public profile of the statistical profession. Deming and others have said to businesses: "You have a lawyer, you have an accountant, but where is your **Statistician**?" (Capitals mine.) I would like every business in New Zealand to ponder this question, and then to immediately engage the services of a consulting statistician. Preferably me.

Ban All Talk of Significance!

It is my strong view that the words *statistically significant* (perhaps abbreviated to significant) have little or no place in scientific papers. If you find yourself using this jargon, think again! Readers of a scientific paper are entitled to ask that authors get quickly to the point. Why say that a new spray regime for growing strawberries led to a "statistically significant increase in yield/plant" when readers would prefer to know that "yield per plant increased by 7% ($p < 0.001$)"? The $p < 0.001$ that I have sneaked in will more than satisfy those who are worried about statistical significance. Beyond that, readers should be looking at the relevant table and checking on SED (standard error of difference) and d.f. (degrees of freedom).

Worse still is fussing over statistical significance when the nature and direction of an effect is clear without doing an experiment. Having tested a variety of weights of lawn roller, one expects an increase in soil depression with increasing roller weight. It is pointless to comment that the increase was statistically significant. Why not get to the point at once and say that "soil depression increased by 3.64 mm (SE = 0.41) for every 1 tonne increase in roller weight"?

Hypothesis testing is difficult to teach. Because it is difficult, an excessive amount of time is taken trying to get the ideas across. Students, and to some extent their teachers, therefore give it an exaggerated importance. For many or most applications the Neyman-Pearson theory has little relevance. There is, in most scientific applications, no sudden cut-off between acceptance and rejection of a hypothesis. Belief is strengthened or weakened - there is rarely a sudden change. Sudden changes, when they do occur, are a result of a new insights to which questions of statistical significance seem of peripheral relevance.

The p-values that biologists (and others) quote are surely a good starting point for the teaching of hypothesis testing. A p-value measures the extent to which a set of experimental results conforms with a hypothesis - "small p-value casts doubt on the hypothesis". In a first course this is about all one needs to say. Probability arguments should come later, when students are mature enough to wrestle with the alternative ways of setting down the evidence - the use of likelihood ratios, Bayesian perspectives, and a theoretical framework (such as Cox and Hinkley's Pure Significance Testing) for p-values.

Let's avoid the confusion and waste of words that results from overt talk of statistical significance.

J.H. Maindonald

Impressions of the 1988 NZSA Conference

When the American Statistical Association had its conference in Chicago a few years ago the Chicago Tribune ran a story in which it concluded that a statistician is "someone who doesn't have the personality to be an accountant." After this year's breathtaking N.Z.S.A. conference there was no danger of a similar article appearing in Palmerston North's Evening Standard.

The conference blended technical talks with lively panel discussions on statisticians as expert witnesses and statistical consulting under user-pays. Both discussions emphasized that statisticians need to be able to communicate technical concepts in clear, everyday language either to edify a lawyer or to win a client's confidence and money. The case study of the Maxicrop trial showed that being an expert witness can be both mentally and physically exhausting, though the comforting thing is that you get paid when it's all over.

After a long, warm day in the conference rooms there were over a hundred thirsty people ready to drink orange juice. I know of one Chinese restaurant that won't soon forget what statisticians are like after having a few orange juices! Maybe they'll want some consulting advice in the future as there is little doubt we left them knowing what statisticians are capable of. The band helped turn the evening into unrestrained frivolity when they called for voluntary performances. The shameless among us couldn't refuse the challenge. We had a range of entertainment, including the classic Bayesian on the barstool joke, a self-penned poem and a sweetly articulated nursery rhyme.

Holding our heads we eased through the following morning's talks. It's possible the conference dinner accounted for the high attrition rate at the AGM.

While there were free lunches in the Wharerate there are no more free lunches at the Department of Statistics or the DSIR for that matter. We heard in the second panel discussion that statisticians and statistical institutions are becoming more active in the business world, further highlighting the versatility of our profession.

The final day was a bonus for those interested in statistical software. We got the scoop on updates of known packages and sneak previews of new ones.

I'm sure we'd all agree that Dick Brook and his colleagues at Massey's Department of Mathematics and Statistics hosted a happy and successful N.Z.S.A. conference in 1988.

Peter Danaher, Maths & Stats, Waikato University

We also surprised ourselves by making a profit of \$2900 (RJB)

*Where have all the female statisticians gone?
or By chance, a nonrepresentative sample.*

I felt that the 1988 New Zealand Statistical Association highlighted the need for statisticians to communicate with each other, with other academics and with the public at large. (Oh for a comedian such as John Cleese to pep up our public image!)

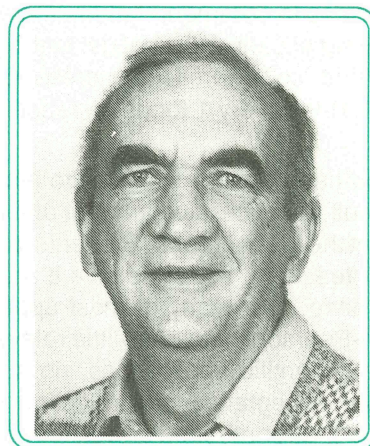
A new statistical journal/magazine has been circulating around our department. The title is Chance: New directions for statistics and computing. It looks more like Time magazine than the Annals of Statistics as its approach is jazzy and non-mathematical. Topics of present day interest are covered; presentation graphics, government statistics and statistical software packages are included in the first issue. Good stuff!

Sprinkled throughout the magazine are photos of real life statisticians who edit, sub-edit or who have contributed papers. But wait! Where are the women statisticians? Of the 28 faces, only 2 were women (one being a Janet Norwood). Now, female statisticians are few in number in New Zealand universities. Does the same apply in the United States? I quickly dug out the last two editions of Amstat News, the newsletter of the American Statistical Association. In the first of these were photos of 20 statisticians - 17 males and 3 females (including Janet Norwood); in the second, 4 photos - 3 males and (you guessed it) Janet Norwood. I wonder if the female statistician is an endangered species.

This newsletter was meant to show that New Zealand was different. I wrote letters, I phoned, I phoned again but, alas, I could only get photos of three statisticians - all males. I take some consolation in the knowledge that kiwis are nocturnal and it is hard to capture them, male or female, on film. There are going to be some changes in the next newsletter! You may anticipate photos of the NZSA committee for a start while others will contribute to "What statisticians do", also with photos and females will be well to the fore.

Hope you get time to relax over Christmas. See you next year.

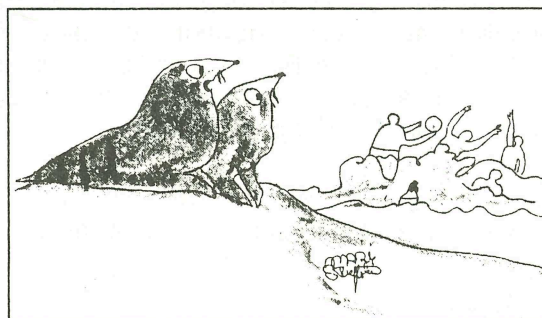
Dick Brook
Editor



LOTTO

Two statisticians at Massey University have been in the news at various times this year in connection with the game of LOTTO. NZSA members will recall Hugh Morton's article in the Journal, and this has led to his comments on RNZ's "Morning Report" and an appearance on TVNZ's "Fair Go". Hugh has also recently given evidence on behalf of the Commerce Commission in a successful prosecution under the Fair Trading Act against the seller of a LOTTO system which was claimed to be able to improve one's chances of winning. Greg Arnold's comments in some of the odds involved in the game can be read in a recent issue of "The Listener". Hugh and Greg have provided such sobering statistics as : the expected waiting time for someone who spends \$5 every week to hit the jackpot is around 7381 years; a ticket holder is approximately five times more likely to be killed on NZ's roads this week than win Saturday's jackpot. Greg says that the good news is that a

habitual gambler could reasonably expect to recoup about one quarter of a lifetime's outlay through fourth and fifth division prizes! Hugh also tells us that participation in LOTTO has virtually stabilised and that the extra "investment" generated by large jackpots appears not to be showing diminishing marginal returns.



Cartoon by Mark Stueffelen

"It's that time of year again, when the humans shed their fur and migrate back to the ocean."

News from Members

Otago

The news this time is entirely from the Mathematics and Statistics Department of Otago University.

Russell Dear has been visiting us this year. Russell, a teacher at Southland Boys' High School, has held a teaching fellowship in the department, including a Woolf-Fisher Fellowship and the "C. Oswald George Prize". The latter was awarded by the Institute of Statisticians for an 1987 article in Teaching Statistics, "A cluster of fourth-formers".

Planning for ICOTS3 is well under way. Confirmed dates are August 19 to 24, 1990. A budget and the first circular are about to be produced.

Our University of Otago Department of Mathematics and Statistics Report Series has some recent reports of interest to statisticians. If you would like a copy, please write to J. Rayner, Department of Mathematics and Statistics, University of Otago, P.O. Box 56, Dunedin.

John Rayner, Maths/Stats, Otago University



Auckland

An important item of statistical news at Auckland since the last newsletter is the appointment of Craig Ansley as NZI Professor of Banking and Insurance in the School of Commerce. Craig has previously been Professor of Statistics and Econometrics in the Business School at the University of Chicago, and Professor of Management at the Australian Graduate School of Management. He is well-known throughout the world for his work on time series.

Jeff Hunter returned in August from a year's leave, spent mainly in North America. Cathy Macken and Brian McArdle (Zoology) both return at the end of the year. Brian has recently had his book on multivariate methods accepted for publication. This will be the third book on multivariate statistics by Auckland authors in recent years, joining those by George SeBer and Peter Hosking in Geography. George SeBer's latest Wiley book, a massive treatise on Non-linear Regression written with Chris Wild, will appear in the next few months.

Alister Stewart has recently returned from a brief visit to Europe where, among other things, he attended the 14th International Biometric Conference in Belgium and spent two weeks working in Helsinki at the MONICA Data Centre. The centre co-ordinates data from forty centres, monitoring trends and determinants of cardiovascular disease throughout the world.

Alistair Scott, Maths/Stats, Auckland University

Wellington School of Medicine

A significant amount of our work is with our colleagues the epidemiologists, whose interest is describing the distribution of disease and identifying those factors that increase the risk of disease.

Clare Salmond has been working on a study of hepatitis B amongst police and customs workers. The objective was to assess whether the rates of hepatitis B infection, past or current, are higher in these occupational groups than the general population. The analysis problem was one of using iteratively re-weighted least squares regression to assess prevalence ratios of infection adjusting for a number of confounding variables.

Neil Pearce, a diploma in statistics graduate turned epidemiology PhD. is working on a number of projects relating to occupational exposures to agent that may increase risks of cancer. On the statistical methods side, he has been investigating methods of analysing cohort (observational follow-up) studies that involve time-related factors. (These are variables whose value changes for an individual during the period of follow-up, eg exposure to asbestos.) The methods he evaluated are logistic regression. Cox's proportional hazards model, and Poisson regression. Logistic regression is inadequate since its form treats all factors as fixed, and does not allow a subject to accumulate exposure over time. The Cox model and the Poisson regression both involve complicated programming. They both gave identical results, but Poisson regression has a number of advantages in terms of cost, computational complexity, and conceptual simplicity.

Both of these problems involve modelling the odds ratio, relative risk, rate or prevalence ratio. They fall into a common class of linear models for binary outcome variables. Within the school, statisticians and epidemiologists, staff and graduate students, have met regularly to discuss what these models are and issues of assessing and controlling confounding, interaction assessment, use of significance testing (the case against their use), appropriate treatment of continuous study factors. Colin Cryer is using these sessions to aid the development of guidelines/strategy for applying these analysis methods.

Finally, Neil Pearce and Colin Cryer have been busy preparing for a one week course that they are mounting: An Introduction to Epidemiological Methods. The course gives an intensive introduction and overview of the design and analysis methods used in epidemiological research. This course will take place from November 28 to December 2.

Colin Cryer

News from Members continued.....

VUW Institute of Statistics and OR

We are pleased to announce the arrival of Peter and Anna Smith from the UK. Peter, previously a lecturer at Glasgow University, has already settled into the somewhat chaotic life of the Institute and, overnight, has lowered our average age to a much more respectable figure. He is Bernhard Flury's (or Ken Russell's) replacement and his appointment finally brings us up to full strength. Peter's research interests are in telecommunications and time series. Anna is in demand as a relief secondary school teacher, but is actively campaigning for a job in the tourism industry; she must have the only Masters degree in Tourism in New Zealand.

ISOR, AMD and the Department of Statistics are also looking forward to the arrival of Andrew Bruce and Deborah Donnell. Thanks to David Vere-Jones going on to 85% time, Andrew will be employed half-time in the Institute and half on secondment with the Department of Statistics. Andrew's interests are in robust time series analysis and seasonal adjustment. Deborah will be working full-time with AMD. Applications have now closed for the recently advertised post in Financial Mathematics in the Institute. We are hoping to make an appointment soon; this post will support our new Diploma in Financial Mathematics which is expected to be offered next year. The money for this appointment is coming principally from the NZ Life Insurance industry.

This year has been a good one as far as grants are concerned. The UGC and the University have supported our application to enhance the ISOR Research Facility by providing funds for further additions to the Olivetti/AT&T 3B2 (mainly ethernet) together with a new machine, a colour Sun 3/60 workstation. Under the Teaching Equipment Replacement scheme we have received funds to set up a postgraduate Statistical Graphics Laboratory containing mainly Macintosh microcomputers which will act as stand-alone devices or as graphics workstations to the ISOR computers running S. The ISOR Statistical Graphics Laboratory will be for postgraduates from ISOR and the wider University statistics and OR community.

During the year we have had a number of visitors including Jock MacKay (University of Waterloo), Rolf Turner (DMS, CSIRO), Professor Wenci Yu (Fudan University, Shanghai), Greg Arnold (Massey University), Craig Ansley (Auckland University), Malcolm Faddy (Otago University), Laimonis Kavalieris (Otago University), Shanti Gupta (Purdue University) and Mike Camden (Wellington Polytechnic).

Over the Christmas vacation our two old houses (42 and 44 Kelburn Parade) are to be physically linked by a rather fancy stairwell. This, together with other modifications and facelifts, will make ISOR much less of an eye-sore and, more importantly, will give us added space and put us all under the same roof. In terms of electronic communications, the premises will also be linked by an ethernet connection to the main backbone fibre optic network that is to be installed around campus during the same period.

A new ISOR series of seminars on applications of statistics has just been completed. This was targeted at University

and down-town users of statistics and has proved to be very successful. The credit for this innovation goes to Philip Morrison.

The University statisticians (Ross Renner ably assisted by Elisabeth Robinson) have had a heavy workload to cope with in the absence of Stephen Haslett who is due back from sabbatical leave at the end of November. Ross is about to depart on a short trip to Canada where he will deliver a paper at a Colloquium on Statistical Applications in the Earth Sciences organised by the Geological Survey of Canada. Brian Dawkins will shortly be going on sabbatical leave for one year at the University of Waterloo and Peter Thomson is leaving at the end of October for four months at the Institute of Statistical Mathematics, Tokyo.

Peter Thomson

MAF Tech

Wallaceville Animal Research Centre

STATISTICIAN

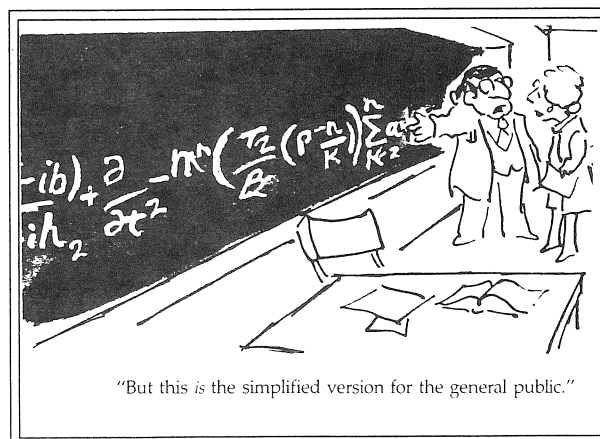
Vacancy No. 88/4

There is a vacancy in the Biometrics Section of the Wallaceville Animal Research Centre for a suitably qualified person to work as a statistician. The appointee will use modern statistical software to assist scientists with the analysis of experimental data. Applicants should have a degree in mathematics with a major statistical component. Experience in the biological or related fields would be an advantage. The ability to communicate with staff in other disciplines and work with a minimum of supervision is essential.

The appointment is initially for one year, with the potential for long term employment.

Applications should be made on Form PS17A (available from your nearest government department) quoting the vacancy number. Please forward to the Administration Officer, Wallaceville Animal Research Centre, P.O. Box 40063, Upper Hutt.

Applications close on 9 November 1988.



Massey

Throughout this academic year, the statisticians in the Department of Mathematics and Statistics at Massey University have been busy popularising and improving the profile of statistics. A series of talks aimed at the university community in general (and were therefore not rigorous academic seminars) were organised under the title of 'Statistics At Your Service'. Statisticians, economists and bankers from the Manawatu and as far afield as Ruakura gave talks on various topics such as presentation of results of data analysis in scientific publications, gambling in New Zealand, manpower planning using Markov models, why banks measure to change, the award-winning ranking and selection PC software (RANKSEL), and statistical consultancy.

There was considerable interest from the Massey community in these topics, and we expect to continue the series next year. If you have a favourite topic in applied statistics which you are keen to talk about give us a buzz. We may be able to arrange something (especially if you intend to come through the Manawatu region on some other business!).

Charles Lawoko

DSIR Applied Maths Division, Mt Albert

Congratulations to Jocelyn (and John) Dale on the birth (1.10.88) of a son, Alwyn Julian. After a brief spell with us Peter Walley has resigned to finish his book on *Statistical Reasoning with Imprecise Probabilities*. He expects, in due course, to return overseas. Welcome to Louise Rattray who joined us as part-time Administrative Officer at the beginning of June, and to Murray Wood who joined us in July as a database trainee. Nye John has been with us for two days a week since the beginning of August - we are expecting Academia will claim him sometime soon! In the meantime we are enjoying some excellent discussions on Design of Experiments. Eight of the Auckland AMD staff attended a course on *Quality Improvement for Team Leaders*, run by Maurice Fletcher and Nye John over October 4-6.

John Maindonald

Stop Press

Nye has accepted a chair in Statistics and Quality Improvement at Waikato University.

MAFTech, Southern Region

We will make something happen by next time!

Roger Littlejohn

News from Oz

Dick Brook asked me to write for the newsletter, on the grounds that I was the only correspondent he had in Australia. Ah well, flattery will get you nearly anywhere. But am I to be the correspondent for my workplace, or for Melbourne, or Victoria, or even Australia? I'll aim high, and wait for someone to knock me down to size.

Statisticians are becoming more involved with the law, it seems. Two separate talks entitled "Statistics and the Law" have been presented in Australia recently. At the July meeting of the NSW Branch of the Statistical Society of Australia (SSA), Professor David Newell (formerly at the University of Newcastle-upon-Tyne, now Managing Director of SIROMATH) recounted his experiences in a famous case on whether there was an association between the incidence of cancer and the fluoridation of water. Then the September meeting of the Victorian Branch heard Dr Stuart Crosbie (ex-MAF, now Manager of Biometric Services with the Victorian Department of Agriculture and Rural Affairs) talk about ... yes, you've guessed it ... the Maxicrop case. An excerpt from that particular "Fair Go" program provided an additional point of interest in Stuart's talk.

Stuart had earlier spent over three months in the United Kingdom, visiting various agricultural research centres in England and Scotland. He returned with lots of information on the various ways in which biometric groups are organised, and also with much greater knowledge of the new version of Genstat and the people who have designed it. One consequence of the latter is that a three-day Genstat workshop will be organised in Melbourne late in November, featuring various invited speakers (including two from Rothamsted and one from New Zealand). I understand that a small contingent of Kiwis will be in attendance to soak up some knowledge. We'll tell you more about the Conference in the next report.

A letter in the last Newsletter of the Statistical Society of Australia help up this Newsletter as a good thing to emulate. It's nice to be flattered, but there's a disadvantage, too; your poor Editor won't be able to rest on his laurels now.

Ken Russell, Department of Agriculture, Victoria

Ken, how would you like to set a precedent by editing this newsletter from Oz? RJB

A judge is not supposed to know anything about the facts of life until they have been presented in evidence and explained to him at least three times.

Lord Chief Justice Parker

STATISTICIANS

(3 positions)

A\$30,100-A\$51,552

Division of Mathematics and Statistics, Sydney

THE DIVISION: The Division of Mathematics and Statistics has recently undergone a major re-organisation. It now operates within a new Institute of Information and Communications Technologies and carries out mathematical and statistical R and D for the benefit of Australian industry, with particular emphasis on the information and communications industries sector.

As a result of the re-organisation, there are a number of exciting and challenging opportunities for statisticians and mathematicians to join the scientific staff, presently about 40 professionals located in Sydney, Melbourne, Adelaide, Canberra and Perth. The Divisional Headquarters is in Sydney. The Division offers a stimulating working environment, excellent library and computing facilities and opportunity to develop close links with, and carry out work of major importance to, Australian industry, in one of the Division's four research programs:

- Applied and Industrial Mathematics.
- Applied and Industrial Statistics
- Signal and Image Analysis.
- Computers, Software and Networks.

THE PROGRAM: Members of the Signal and Image Analysis program are active in fundamental research areas related to the analysis of signal, time series and image data, including problems in classification, discrimination, noise removal (using both space/time and Fourier domain methods), signal outlier detection, mathematical morphology, spatial stochastic models and annealing algorithms. Industrial and scientific applications have been and are being developed for several industries, including agricultural, mineral exploration, manufacturing and textile processing industries. A special interest is in remote sensing and the analysis of spectroscopic data.

An advanced software environment for image analysis research has been developed on a network of SUN and VAX computers. The Program has groups located in Sydney and Perth.

**SENIOR RESEARCH SCIENTIST/
PRINCIPAL RESEARCH SCIENTIST**
A\$38,203-A\$51,552 – 1. Position E0005

RESEARCH FELLOW

A\$38,203-A\$51,552 – 2. Position E0006

THE JOB: The appointee will be expected to initiate research and provide scientific leadership in image analysis research areas. He/she will be expected to initiate consulting and collaborative research with Industry and with scientists from other CSIRO Divisions, and to supervise and guide the continuing development of image processing software.

THE PERSON: Applicants should hold a Ph.D. or equivalent qualification in a branch of statistics or other relevant discipline and have an extensive research record. He/she will be able to demonstrate the ability to lead a research team in the planning and implementation of applied statistical projects.

CONDITIONS: Position E0005 is available on an indefinite basis and position E0006 is for a term of three years. Australian Government Superannuation benefits are available.

RESEARCH FELLOW

A\$30,100-A\$43,861 – 3. Position E0013

THE JOB: The appointee will be expected to undertake research into methods in signal analysis, time series, and/or high dimensional multivariate analysis for the analysis of data.

In undertaking research in this area, appointees will be expected to consult and collaborate with Industry and with scientists from other CSIRO Divisions.

THE PERSON: Applicants should hold a Ph.D. or equivalent qualification in a branch of statistics or other relevant discipline. The ability to initiate, plan and complete research projects with industrial and other CSIRO collaborators is essential. Preference will be given to applicants with relevant research experience and computing skills.

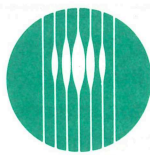
CONDITIONS: Appointment will be for a term of three years with Australian Government Superannuation benefits available.

MORE INFORMATION: Prospective applicants are invited to contact: Dr M.A. Cameron (02) 467 6566 (murray@natmlab.oz) for further information. A copy of the job descriptions and selection criteria for all positions can be obtained from Mrs Sigrid Loofs on (062) 81 8534 or at the address below.

APPLICATIONS: Applications should be submitted by 2 December, 1988 and quote the appropriate reference number(s). They should be framed against the selection criteria and should state relevant personal particulars including details of qualifications and experience. Applicants should nominate at least two professional referees, and address their applications to:

**The Acting Chief
CSIRO Division of Mathematics
and Statistics
GPO Box 1965, Canberra City, ACT 2601**

CSIRO IS AN EQUAL OPPORTUNITY EMPLOYER



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AUSTRALIA

AB1 88/09

STATISTICIAN

(Image Analysis)

A\$30,100-A\$43,861

Division of Mathematics and Statistics
Sydney — Australia

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THE JOB: Carry out research into statistical and mathematical methods of analyzing image data, implementing new methods in software and applying them where appropriate.

In undertaking research the appointee will be expected to consult and collaborate with Industry and with scientists from other CSIRO Divisions.

THE PERSON: Applicants should hold a Ph.D. or equivalent qualification in a branch of statistics or other relevant discipline. The ability to initiate, plan and complete research projects with industrial and other CSIRO collaborators is essential. Preference will be given to applicants with adequate research experience and computing skills.

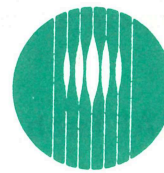
CONDITIONS: Appointment will be for a fixed term of three years with Australian Government Superannuation benefits available.

MORE INFORMATION: Prospective applicants are invited to contact: Dr. M. A. Cameron (612) 467 6566 (murray@natmlab.oz) for further information. A copy of the job description and selection criteria can be obtained from Mrs Sigrid Loofs on (6162) 818 534 or at the address below.

APPLICATIONS: Applications quoting reference number E0007 should be submitted by 21 December, 1988. They should be framed against the selection criteria and should state relevant personal particulars including details of qualifications and experience. Applicants should nominate at least two professional referees, and address their applications to:

**The Acting Chief
CSIRO Division of Mathematics
and Statistics
GPO Box 1965
Canberra City, ACT 2601, Australia**

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STATISTICIANS

(3 Positions)

\$A30,100-\$A51,552

Division of Mathematics and Statistics
Melbourne, VIC. AUSTRALIA

THE DIVISION: The Division of Mathematics and Statistics has recently undergone a major reorganisation. It now operates within a new Institute of Information and Communications Technologies and carries out mathematical and statistical R and D for the benefit of Australian industry, with particular emphasis on the information and communications industries sector.

As a result of the reorganisation, there are a number of exciting and challenging opportunities for statisticians and mathematicians to join the scientific staff, presently about 40 professionals located in Sydney, Melbourne, Adelaide, Canberra, and Perth. The Divisional Headquarters is in Sydney. The Division offers a stimulating working environment, excellent library and computing facilities and the opportunity to develop close links with, and carry out work of major importance to, Australian industry, in one of the Division's four research programs:

- Applied and Industrial Mathematics
- Applied and Industrial Statistics
- Signal and Image Analysis
- Computers, Software and Networks.

THE PROGRAM: Members of the Applied and Industrial Statistics Program are actively involved with Australian industry in such areas as quality improvement, statistical modelling and evaluation of manufacturing processes, and statistical methods for information handling in minerals exploration and processing. The Program's activities include consulting directly with industry and undertaking collaborative and fundamental research in areas relevant to Australian industry. Program scientists are committed to transferring the results of their research to industry. The program has strong links with other CSIRO Divisions and has members in Sydney, Melbourne and Adelaide.

1. Position D0016

RESEARCH FELLOW

\$A30,100-\$A43,861

THE JOB: The appointee will be attached to the Division's Quality Control Project with a major objective of fostering excellent statistical practice in Australian industry. He/she will take responsibility for making direct contacts with industry in Melbourne, and to consult and collaborate with industrial groups, individual companies and relevant organisations with a view to integrating statistical thinking into quality improvement programs. He/she will be expected to contribute to the Project's research into statistical aspects of quality control procedures.

THE PERSON: Applicants should hold a Ph.D. or equivalent qualifications in a branch of statistics. Preference will be given to applicants with a proven record of independent statistical consulting and research, possessing a high level of drive and initiative and an understanding of the application of statistical ideas in total quality management.

CONDITIONS: Appointment will be for a term of three years with Australian Government superannuation benefits available.

2. Position D0009

SENIOR RESEARCH SCIENTIST/PRINCIPAL RESEARCH SCIENTIST

\$A38,203-\$A51,552

THE JOB: The appointee will be attached to the Division's project in Statistical Modelling and Evaluation of Manufacturing Processes and will be expected to provide scientific leadership of the project in Melbourne, working closely with the Division of Manufacturing

Technology. He/she will be responsible for developing further this collaborative activity and defining collaborative research projects directly with Industry. The project has close links with the Division's Quality Control Project and it is expected that the appointee's research will reflect those links. He or she will lead the Project's research in the area, giving emphasis to fundamental areas of statistical research relevant to the anticipated needs of Australian industry.

THE PERSON: Applicants must possess a Ph.D. or equivalent qualification in statistics and have a distinguished record of statistical consulting and research. Preference will be given to applicants with experience as a research leader, possessing a high level of drive and initiative and familiarity with the statistical needs of manufacturing industry. Experience gained from working directly with industry will be highly regarded.

CONDITIONS: Appointment will be for an indefinite term with Australian Government superannuation benefits available.

3. Position D0014

SENIOR RESEARCH SCIENTIST/PRINCIPAL RESEARCH SCIENTIST

\$A38,203-\$A51,552

THE JOB: The appointee will be attached to the Division's project on Statistical Methods in Minerals Processing working as a high-level project scientist. The project has strong links with the Australian minerals industry and with other CSIRO Divisions working in the area. Current tasks being undertaken with the project include modelling of stockpiles, estimation of ore grade via sampling from a continuous stream and development of highly efficient software for ore reserve estimation. It is suggested that the appointee will develop active links with the industry to foster excellent statistical practice at all stages of the data gathering process incorporating the ideas of total quality control. The appointee will be expected to carry out collaborative research with the industry as well as more fundamental statistical research relevant to the perceived future needs of the Industry.

THE PERSON: Applicants must possess a Ph.D. or equivalent qualification in statistics and have a distinguished record of statistical consulting and research. Preference will be given to applicants possessing a high level of drive and initiative and familiarity with the statistical needs of the minerals industry gained from direct involvement with that industry. A highly developed ability to define and carry out collaborative research projects is essential.

CONDITIONS: Appointment will be for an indefinite term with Australian Government Superannuation benefits available.

MORE INFORMATION: Prospective applicants are invited to telephone Dr Ron Sandland on 61 2 467 6063 for further information. A copy of the job description and selection criteria can be obtained from Mrs Sigrid Loofs on 61 62 81 8536 or at the address below.

APPLICATIONS: Applications should be submitted by 21st December 1988 and quote the appropriate reference number(s). They should be framed against the selection criteria and should state relevant personal particulars including details of qualifications and experience. Applicants should nominate at least two professional referees, and address their applications to:

The Acting Chief
CSIRO
Division of Mathematics and Statistics
GPO Box 1965
Canberra City, ACT 2601
Australia

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What Statisticians Do

One of my biggies began long before user pays. In 1982 acute awareness of the ignorance about the effectiveness of phosphate rock in being able to supply Phosphorus in general NZ pastoral conditions prompted unusual action.

At that time MAF had decentralised to the extent that it was not possible for a scientist in one region to coerce his counterpart in another region to run specific experiments. The need to obtain pertinent data on phosphate rocks from various (cheap) sources, to see how they measured up against the ubiquitous superphosphate, was strong enough to draw together soil chemists nationwide. But at a price!

Each scientist insisted on being allowed to include, in the experiments in his region, formulations which held particular promise, as well as the standard treatments which everybody agreed on. Result - 19 small plot pasture trials with some common elements and some vast differences - from Kaitaia to the Bluff (almost literally); some mown and weighed, some assessed for production by electronic capacitance meter; irrigated or not; begun in October 1982 or April 1983; modified after 3 years or maintained intact for the full 6 years of the hoped-for duration.

The number of treatments ranges from 15 to 29. Since 15 is deemed rather large for a randomised block an incomplete block design of 9-13 plots per block was used. Typically most of the standard treatments were in one block, the rest of the idiosyncratic ones in the second and, in four trials, every conceivable other treatment of interest in a third block. Three replicates throughout, except for six trials with 4, and two key treatments put into each block of every trial.

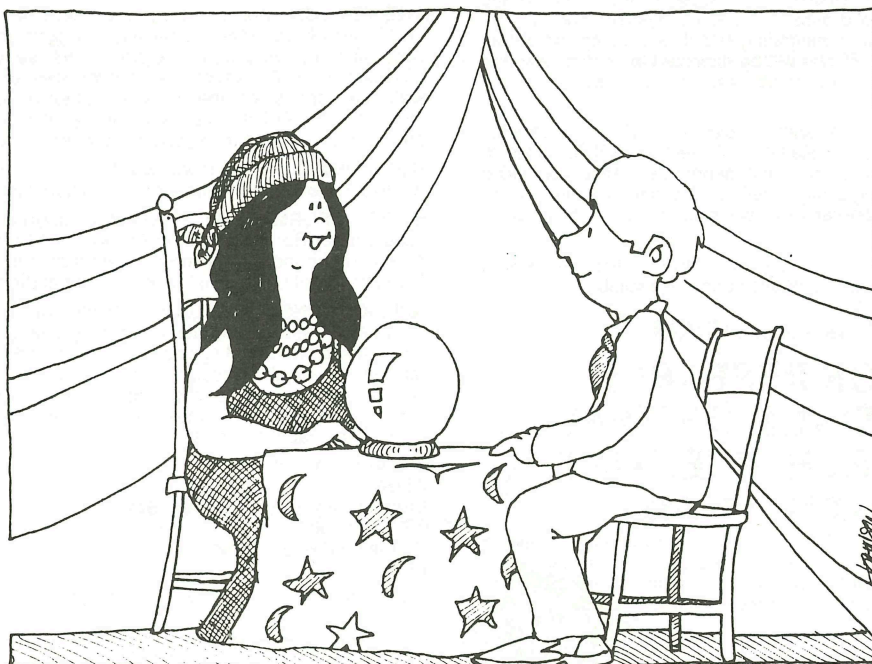
Those still with me will have worked out that the first trials finished last week, so to speak, so that an applied statistician armed with deadlines and two days a week of computing help is attacking a loosely structured data mountain of Olympian proportions. I am going for gold in the shape of weighted regression equations linking phosphatic supplying power to time, soil chemical, soil physical, climatic and pasture management factors. Weighted, because some trials are more equal than others. Trials 7 and 13 you could eat your breakfast off, but I would hope never to see the likes of 9 and 14 again. (I should and might have changed the numbers to avoid a libel suit; just a sign of the times).

The Organic Movement is rapt at being able to contemplate applying 'pure' rock (dust, actually) rather than nasty chemicals, even though the plant root zone fizzes away at the rock to produce the same soluble phosphate forms as the worthy fertiliser plants cook up.

That's the scenario. Now come the interactions with sulphur ...

Chris Dyson, Lincoln

Thanks, Chris, for this article. I enjoy hearing of the kind of statistics others struggle with. Students and lay people are vague, if not ignorant, about the range of problems we tackle. Other members of our association will volunteer to contribute to a series of articles on this topic. Only recently, I discovered a mixed review (RSS News and Notes, September 1988) of two audiotapes produced by members of the Royal Statistical Society on a similar topic, 'The Statistician at Work'. RJB



"How did I get into this business? Well, I couldn't understand multiple regression and correlation in college, so I settled for this instead."

GENSTAT repackaged

Agent: Siromath Pty Ltd. Academic price for PC version \$A1500.

Genstat has a well deserved reputation for being the program which can do everything, but with difficulty. Being a programming language as much a collection of analysis routines it is both more flexible and more complicated than a program permitting a range of standard analyses only. However even its creators no longer deny that Genstat had unnecessary structures, cryptic keywords, obscure syntax, inconsistent conventions and an inscrutable manual. In coping with the constraints imposed by last decade's computers ease of use was given very little weight. Genstat 5 is still complex, but the structures all serve a purpose, the keywords are descriptive, the conventions are consistent and the manual now a reasonably well written textbook. I have conclusive evidence that it works on VAX/ VMS, SUN and PC-AT computers. Wider availability is promised.

The most important change is that Genstat 5 is fully interactive. Commands are still complicated with brackets and punctuation symbols used almost as much as before, but the facilities of a command driven interactive program are all present: help menus are in a well organized hierarchy, key words can be abbreviated to as few letters as needed to avoid ambiguity, results from an analysis are automatically available for further study, a session can be interrupted, stored and resumed later, a transcript of the session can be recorded, files can be opened and closed. One important complaint however is that output is not presented in screen sized pieces.

Statistical facilities have not been extended greatly. Multiple regression, which has always included generalized linear models now includes some standard nonlinear models like the exponential, logistic and gompertz. Diagnostics and stepwise fitting have also been added. The general optimization routine is easier to use, the directive looking more like the FIT directive. Unfortunately the algorithms use single precision and are not favoured by my numerical analysis colleagues. The excellent ANOVA for balanced designs is unchanged, but for unbalanced designs the standard regression procedure must still be used. A nonstatistician should not complain at having to make decisions which are buried in more straightforward programs, but may reasonably object to the programming required to calculate contrasts with standard errors because of the unnatural parameterization used. Multivariate procedures have been tidied to cut down on the number of directives, and provide the building blocks for clustering, multivariate scaling and factor analysis. Time series provides ARIMA modelling, transfer functions and Fourier transforms.

As a programming language Genstat is much improved by the addition of case and if statements. The commands of an interactive session can be stored to form a future program and a BREAK command aids interactive debugging. To facilitate interactive use each statement is now compiled and executed, but there is an option to compile the code in a loop which will speed simulations. Pointers permit the definition of compound structures, and procedures can be made to look like standard directives. Fortran sub-routines can be incorporated in a similar way.

High quality graphics is available, but is dependent on system software which was not available to me. Histograms, piecharts and contours have now been added to the high quality graphics repertoire. The commands appear to give the user considerable freedom in constructing a graph or, put differently, require considerable input from the user to produce just the right graph. Graphs can be superimposed, making it possible to draw a histogram and a curve together.

The real weakness of Genstat lies in the data handling area. Suppose we wished to omit the twelfth observation from a set of twenty fertiliser rates and the corresponding yields. The RESTRICT statement could be used:

```
RESTRICT Fertiliser,Yield / CONDITION=!(11(1),0,8(1))
```

or close examination of the manual suggests that the following might work:

```
CALC (RFertiliser,RYield)=/ (Fertiliser,Yield)
/ $!(1...11,13,14...20)]
```

The latter is about as user unfriendly as Genstat gets. If you can master these complicated list structures they are very powerful. The corresponding statements of MINITAB are simpler, but not as powerful. Indeed the directives for manipulating tables are awkward in all command driven languages and are much less natural than a quick sweep with a mouse in a screen editor.

As a statistician I welcome Genstat 5 because for me the payoff in power and flexibility more than compensates for its complexities. However the arrival of really easy to use programs like DataDesk suggest that Genstat 5 has arrived just in time to become obsolete again.

Greg Arnold, Maths/Stats, Massey University

Data Desk 2.0 Professional

NZ agent- Harold Henderson, Ruakura; NZ price - Academic \$395, Non-academic \$795

For any new statistical program to attract users, it must improve on existing programs in either its ease of use, the range of analyses that it can perform, or its cost. For serious statisticians, only the first two aspects are of real importance, so I shall examine how Data Desk 2.0 Professional (which I'll just call Data Desk here) rates under these two headings.

Ease of use

Recent trends in statistical programs mirror closely those in text-handling programs. Until recently, the latter were all command-line driven, with typed input interspersed with textual output on a screen that behaved like a teletype. They were replaced firstly by screen editors where a cursor could be moved with arrow keys round a screen display of the text file, and more recently by programs that use graphics screens, with multiple fonts and type styles, a mouse to select portions of text and menus for issuing commands.

Many existing interactive statistical programs (e.g. Minitab, Genstat and GLIM) are still command-line driven. However a new breed of user-friendly statistical program is now appearing which, like modern text-handling programs, is based on a graphical user-interface with mouse, menus and windows. I believe that this style of user-interface will similarly come to dominate statistical programs. Data Desk is currently the best example of this approach.

The basic entities of Data Desk are variates (either a list of values or a symbolically stored transformation of other variates), graphical summaries (histograms, scatter plots, rotating 3-dimensional scatter plots, pie charts and various others), textual summaries (such as ANOVA tables or correlation matrices) and 'bundles' which are collections of other entities (much like directories in a file system). Each is represented by an icon which can be opened into a window which displays the item in a format which depends on its type; in particular, a bundle's window just shows the icons representing the entities you have grouped within that bundle.

When running Data Desk, you therefore tend to have various bundle windows visible on the screen containing icons for variates and all the summaries you have previously asked for; some of these items will also be displayed in their own windows. Each time you ask for a plot, do a regression, or create a transformed variate, a new icon is created and a new window is opened (entitled 'plot 1' or something similar). This is simultaneously a strength and a weakness of the program. Everything you do is automatically kept and can be reexamined later; it is easy to compare related plots, ANOVA tables, etc.. However, you must very disciplined to keep track of all these icons and windows; you need (a) to give plots, etc. that you intend to retain a meaningful name, (b) to close the windows of any plots, etc. that you are not currently looking at (i.e. to collapse them back into their icons), and (c) to dispose completely of entities that you will not need later. Data Desk runs on the Macintosh family of micros and the layout problems would be reduced if you are fortunate enough to have a larger than standard Mac screen.

Commands can only be issued by selecting items from pull-down menus. Again this is simultaneously a strength and a weakness. It means that once a few basic principles have been understood, there is no need for manuals since the menus of commands can be fairly quickly searched through. However, in a program that allows as many variants to commands as Data Desk, this approach has resulted in a total of over 208 commands that are organised into the main menus at the top of the screen (there are additional menus in some windows). Although there is some structure in this set of commands (8 main menus, with 95 items of which 23 have pull-down submenus; there are even 7 submenu items with subsubmenus), the result could be a bit overwhelming for a first-time user. A more critical problem is that there is no way to group together and store a series of commands for later use. For example, it is impossible to create a macro to do iteratively reweighted least squares, so fitting Generalised Linear Models is impossible, even though the basic least squares calculations are available. It is similarly impossible to apply the same analysis to several data sets without repeating the sequence of menu commands.

Data Desk is well integrated into the Macintosh environment. It is therefore easy to import data into Data Desk from either text files, spreadsheets, or even terminal-emulation programs. Similarly, results can be easily exported, either textually or graphically for further analysis, incorporation into reports, etc.. Other programs can therefore be used to apply specific statistical methods with Data Desk being used for the aspects of statistical analysis where its strengths lie; as will be seen below, these are far from negligible.

Range of analyses

Data Desk can find a wide range of one-variable and two-variable summary statistics. However the only confidence intervals and hypothesis tests are those that would be taught in a first year statistics course. It has probability plots, principle components, cluster analysis, ANOVA and contingency tables, but all in fairly restricted forms. Data Desk's regression analysis is its most comprehensive feature; it can find various flavours of residuals and leverages for plotting and most of its regression features are very easily specified (e.g. dragging a variate icon into a regression summaries window adds the variate to the regression). However, its regression features do not include polynomial regression, weighted regression or stepwise regression - these all must be manually performed.

When Data Desk is compared with conventional statistical programs, it would therefore seem to be rather lacking in the types of statistical analysis that it can perform. However, Data Desk has one great area of strength in which most other programs are weak — Exploratory Data Analysis. For looking at a set of data and understanding the relationships between the variables, Data Desk cannot be beaten. EDA in Data Desk would usually be based on two or more graphical summaries of the data which would be displayed simultaneously in windows on the screen. As well as conventional scatter plots, histograms, bar-charts, pie-charts and box-plots, Data Desk includes rotating 3-di-

dimensional plots; the latter are extremely effective for displaying the relationships between 3 variates.

The most important feature of Data Desk for EDA is its linkage of cases in all visible graphical summaries. Various 'tools' are available to highlight and assign plotting symbols to cases on a graph and these also affect all other visible graphs in the same way. For example 'brushing over' an apparent cluster of points in one graph would highlight the same cases in all other graphs. This linkage extends to histograms, piecharts and dendrograms as well as 2- and 3-dimensional scatter plots.

For my review of Data Desk, I decided to try it out on a set of data from Mosteller and Tukey (1977) which consisted of the maximum January temperature, latitude, longitude and altitude for 62 cities in the USA, the intention being to relate temperature to the other variables. The power of the program for exploratory work is shown by the fact that it soon showed up an error in the data set which had caused in Mosteller and Tukey to mistakenly identify Jacksonville, Florida as an outlier with unusually high temperature for its latitude; the real reason for it being an outlier was that it had been erroneously recorded as being 8 degrees too far north.

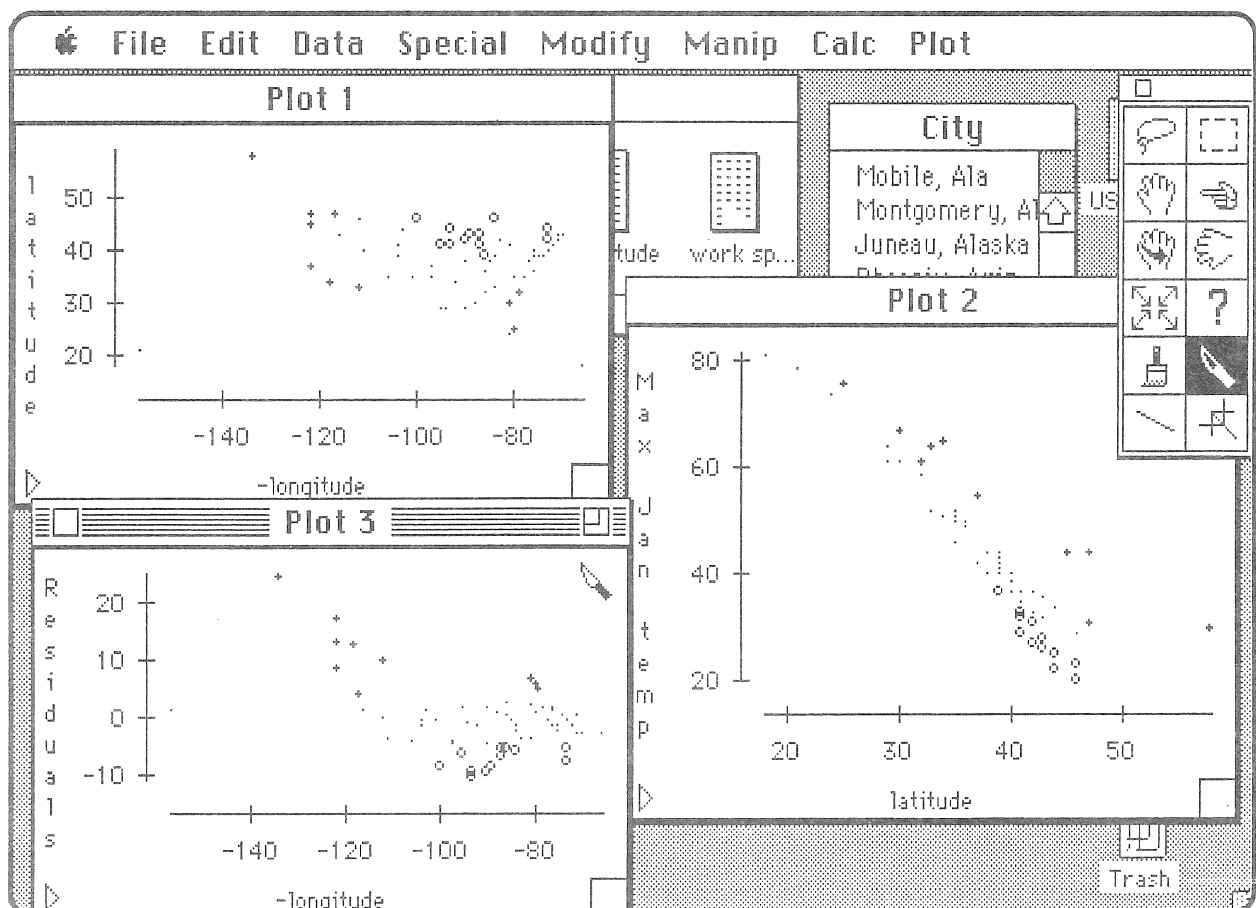
The 4 numerical variates, plus another which contained the names of the cities were created and the city-name variate was selected to be displayed when the 'query tool' was clicked over a cross in any graph. The first two scatter plots that were first created were latitude vs. longitude (to show the locations of the cities) and temperature vs. latitude

(since latitude would be expected to be the major factor influencing temperature). The residuals from a regression of temperature vs. latitude were also plotted against longitude. The extreme residuals were next selected using a 'slicing tool' and Data Desk was told to display these cases (in all plots) with different symbols. The 'query tool' was used to identify the names of the cities with extreme residuals and the simultaneous highlighting of the outlier Jacksonville, Florida in the latitude vs. longitude plot made it obvious that it had been recorded as too far north. The corresponding screen display for the corrected data is shown below, and clearly shows the regions that are unusually warm and unusually cold for their latitude in January. (Note that the three cities in the North-West, South-West and South-East of the latitude vs. longitude display are Juneau (Alaska), Honolulu (Hawaii) and San Juan (Puerto Rico).)

Conclusion

Data Desk is an ideal program for users who do not require advanced statistical techniques and whose analyses are strictly one-off, due to its graphics (and especially the linked graphs discussed above) and its user-interface which is both easy to learn and easy to use; it encourages users to explore their data and will often bring out unsuspected features in that data. For those who require more advanced statistical techniques, I'd still recommend the use of Data Desk in conjunction with another program. I forecast that it's best features will become requirements in future statistical programs.

Doug Stirling, Maths/Stats, Massey University



Minitab for the IBM PC

MINITAB for IBM-compatibles is targeted for higher level educational and professional applications, and requires 512K RAM. Unit pricing is \$695. Agent: Minitab Inc 3081 Enterprise Drive, State College, PA 16801.

As part of the NZSA Conference I had the opportunity to spend some time getting to know the PC version of Minitab, version 6.1.1. This a full blown version of Minitab, handling all the features, including full on-line help that the version on the PRIME computer system at Massey University, and then some.

The package comes complete on six 5.25" disks. The minimum system configuration is a PC with two floppy disks and 512k of memory. Since it will do some graphics, a graphics board is recommended, as is a hard disk and a math coprocessor. If the program is loaded onto a hard disk, it will take up about 1.6 megabytes of disk space.

The user interface is the same command line driven method as all the other versions of Minitab, so as an experienced user of the PRIME I found that the learning curve for the implementation of Minitab was very short. Obviously the structure of the data units is the same, columns, constants, and matrices being the components that the user can manipulate. I found that by experimenting that my system (with 640k of RAM) with only Minitab would take about 15000 entries, ie about 15 columns each with 1000 rows. Any combination of number of columns and rows up to the maximum free memory after DOS and any memory resident programs (such as sidekick) have been loaded. Being a person who likes to have some added features to the system, I did run Minitab with a variety of memory resident programs loaded.

This version of Minitab includes a slightly improved analysis of variance compared to the previous versions of Minitab that I have used. Minitab does not require balanced experiments for one way ANOVA but insists on balanced experiments for multiway ANOVA. The manual politely suggests to use the regression with the indicator commands for unbalanced experiments.

For one way ANOVA there is a choice of two data structures. AOVONEWAY assumes that the data for each level is in a different column; and ONEWAY expects all the data in one column and a column of corresponding subscripts.

TWOWAY performs ANOVA for balanced two-way data. ANOVA performs analysis of variance for multiway balanced designs. The factors may be crossed,

nested, fixed or random. You are limited to 50 response variables ANCOVA performs analysis of variance and covariance for orthogonal designs. However, for unbalanced designs you must return to the regression command.

The extra feature that I found nice on this version was the slightly improved graphics. On my machine there is a Hercules graphics board. I had no problem configuring Minitab for use on my machine. However, for some reason, another IBM clone we have in the department would not display graphics or produce the help screens when requested, even though it also had a Hercules graphic board. However, this problem was easily fixed by means of a small comm only available utility.

One of the other 'selling points' is the supposed compatibility with implementations of Minitab on other (bigger) computers. I tried loading onto the Prime some of the example work-sheets that came with the PC version. Minitab wasn't interested in reading these work sheets, informing me that they were incompatible since they were recorded using a different version of Minitab. I also tried going the other way with similar results. Having never made use of work sheets saved before an update then using them afterwards I cannot say whether this is a common fault. However, since it is common to have your data in ASCII files and then to read them into Minitab, I do not see this as a major problem.

Packaged with the PC version is a utility to convert to and from Lotus work-sheets. Since there are numerous utilities to convert Multiplan, Visicalc, Supercalc formats to and from Lotus, it should be possible to make use in Minitab of data collected in any of these formats.

Numerically, the PC version of minitab works as well as the version on the Prime. Reworking calculations made using the PRIME version on the PC version did not show any numerical differences and I could not notice any difference in what I would call the effective speed of operation between the time shared PRIME Implementation on a moderately busy day and the PC version.

Robert Crawford, Maths/Stats, Massey University

Mass Stats Package

MASS is produced by Western Statistical Computing Associates (Westat), PO Box 247, Nedlands, WA 6009, Australia, and costs A\$450 for the Mac version of A\$495 for the MSDOS version (each plus about 15% sales tax).

This is not a reviewer but rather a recall of a 45-minute demonstration of the MASS package that I attended during the conference together with some regurgitation of information from relevant brochures. I have not actually used the package myself and I did not know at the time of the demonstration that I would have to produce a review of it (thank you Dick!). Having made that disclaimer (and bearing in mind that my recall is not the greatest), I must say that what I saw of MASS did impress me.

MASS (Microcomputer Applied Statistics System) is available for both Apple Macintoshes and MSDOS machines, but the demonstration was on a Mac. The authors have made good use of the Mac interface. All screen output appears in a scrollable window making it very easy to recall previous output, commands, etc. All commands are available through pull-down menus and many have keystroke alternatives, something that the experienced Mac user will appreciate. On-line help is available.

MASS produces the usual summary statistics, histograms and plots (again these are very nice on the Mac), tables, transformations, one- and two-sample inferences, nonparametric tests, multiple regression and correlation. Features not found in many micro computers include an extensive cross-tabulation facility which would be useful for survey data and suchlike, and the ability to handle up to a 7-way ANOVA's. Certainly the ease with which one can tell MASS how to perform an ANOVA for complicated designs is impressive for a micro. Again from my limited experience, the package did not appear to be slow in any way.

Whether MASS is worth the cost or not I am not able to say, but someone who wants a package with real power and a good Mac interface should certainly take a good look at MASS.

Howard Edwards, Maths/Stats, Massey University

More than 20 years ago, James Burke (of BBC TV's *Burke's Progress*) reported on a survey of the readership of scientific papers. A figure that has stuck firmly in my mind was that the average readership of mathematical papers was 0.48. This means that even the authors rarely read their own papers.

RSS News & Notes, Oct 88

1988 REGIONAL SCIENCE FAIRS - STATISTICS PRIZES

During 1988 the Association judged at seventeen of the N.Z. Regional Science Fairs. The statistics prize is jointly sponsored by the NZ Statistical Association, the Department of Statistics, the Applied Mathematics Division of the DSIR and the Ministry of Agriculture and Fisheries. The basic objective of the statistics prize is to improve and enhance the level of statistical awareness within the secondary school system.

The Association and the organisers wish to take this opportunity to record their appreciation of the excellent job done by the judges (unfortunately, too numerous to mention here).

The basic problems outlined in my last year's report still seem to be apparent.

The message is still not getting across to teachers that the sensible collection of data and their analysis is an essential part of science. Many of the exhibits which more naturally lend themselves to some sort of statistical analysis are of a biological or social science nature. In contrast, much of the new emphases on statistics are in the mathematics courses, and I suspect some of the exhibiting students are not being exposed to them. This is because many students doing biological and social science type subjects have a weak mathematical background, and may drop it before they reach 6th or 7th form level, or may have insufficient time to take mathematics also. I suspect that, by trying to increase statistical literacy through the mathematics teachers, we effectively bypass many students who take biological and social sciences and should be major users of statistical techniques.

Another interesting observation was made by John Waller: "I have tended to award the statistics prize to students in the 'lower' forms, and I feel this is because the older students acquire a form of 'tunnel vision' and only seem to be able to regurgitate fairly standard things. The students in the 3rd to 5th forms do seem to be more 'free thinking'. This may be directly attributable to schools. Feedback from mathematics students involved in the 7th form practical statistics exercise indicates that many are actively discouraged from undertaking any investigation unless it is obviously suitable for the exhibition of all the 'standard' techniques taught.

To sum up, many exhibitors had collected data almost as an aside, and there was no real attempt to interpret and explain its meaning. The data were used to produce a few bar or pie charts to fill in a corner of their display, with no further thought about their meaning.

This year the Association also ran a trial poster competition at the Wellington Science Fair. The choice of subject was entirely unconstrained, the accent being on clear attractive and informative displays of numerical information. One of the major reasons for running a poster competition was that of the above paragraph. The poster is primarily numerical, and thus must hold itself together as such. The judges were pleased with the standard of entry and there were a few to which we would have been quite happy to award prizes.

The prize winner (\$50) was Meredith Marra of Marsden School for her poster "Have You Ever Wondered ...". It was the originality of the topic which

intrigued us, being people estimates of the length of Jack's Bean Stalk.

I suspect some potential exhibitors may have difficulty of thinking of suitable topics. Occasionally interesting graphs appear in newspapers or advertising handouts (good and deceptive). I would be most grateful if members could post me suitable copies so that I can collect together ideas for next year.

We hope that by 1990, we will have a suitable collection of posters to display at the ICOTS 3 Conference in Dunedin.

David Harte, MAF

1987-1988 Report from the Education Committee:

In 1988 members contributed to the Supplement to the Mathematics with Statistics Teachers Guide produced by the Education Department. In particular; Peter Thomson has provided a list of suitable statistics texts, Mike Camden (assisted by Peter Thomson) is making available a set of databases for schools to use and Brian Dawkins has written a pamphlet on 'The Graphical Representation of Data'. It is hoped that this will be one of a series of pamphlets, the publication of which has been made possible by a grant from Professor J. Campbell for which we are very grateful. We welcome suggestions for topics and volunteers for authorship.

Letters and/or submissions have been made to AAVA, the Picot Report, the Mathematics Syllabus Review Committee and the Education Department.

Two members were invited to attend the Royal Society Forum on Education in May. The following is a copy of our report to the Royal Society.

The Education Committee of the NZSA endorse all the positive suggestions which came out of the forum. As we see them, these are:

1. Improve the management of schools.
2. Provide training at the tertiary level to equip science teachers with the knowledge about science they need to be effective teachers
3. Stress the need for "science for all", that is an understanding of the effects of science on our lives and an appreciation of its value for development.
4. Provide adequate funding for education. Education, and particularly science education, is the only way to cope with the stresses that are being placed on our society as we fail to keep up with the Western world with whom we still want to compete and trade.
5. Focus on the skills needed by modern technology.

6. Focus on numeracy for all. Our achievements in literacy have been excellent. Now is the time to focus our attention also on numeracy.

Unfortunately, we have not yet heard of any follow up to the Forum being undertaken by the Royal Society.

A poster competition run in conjunction with the Wellington Science Fair was organised and David Harte was co-opted on to the committee for this period. David's report on this is included in his Science Fairs report elsewhere in the Newsletter.

The Education Committee has offered to handle publicity in the Polytechnics for ICOTS III and possibly co-ordinate sources of funding for tutors.

We are hoping to organise a national children's census/referendum to be run during ICOTS.

Much of the committee's work arises from ideas and suggestions from the general membership of the Association. We need YOUR Input in order to make a real contribution to statistics education.

Sharleen Forbes (Convenor)
Andy Begg Mike Camden
Brian Dawkins Elizabeth Robinson
Jean Thompson Peter Thomson

Local Co-ordinators

Wellington - *Brian Dawkins*
 Otago - *Peter Johnson*
 Auckland - *John Maindonald*
 Christchurch - *Elizabeth Wells*
 Nelson - *Michael Ryan*
 Motueka - *Peter Alspach*
 Hamilton - *Waikato Centre for Applied Statistics*

Sharlene Forbes, MAF

Fourth International Meeting on Statistical Climatology (4IMSC)

27-31 March 1989 at Rotorua

75 overseas speakers have submitted abstracts of papers for presentation at 4IMSC and (doing our bit for tourism) at least 30 spouses/family members plan to accompany them. The provisional session programme can be obtained from me.

As 4IMSC starts in the middle of Easter it is hoped that NZSA members domiciled in the north (in particular those in the educational field who have vacation days on Monday, Tuesday 27, 28 March) will be able to attend at least part of the programme. The Statistical Association and Meteorological Society are sponsoring an 'ice-breaker' function on the evening of Sunday 26 March.

Tuesday 28 March is a special day catering for visitors, with 3 lead speakers plus 4IMSC dinner with guest speaker Dr Kenneth Hare. To encourage NZSA/MetSoc members from Auckland/Waikato an excursion trip is being considered (see notice); if spare seats are available family members would be welcome to join the excursion and could participate in the alternate 4IMSC programme (trips to Agrodome etc).

John Revfeim

Convenor Organising Committee 4IMSC

Special Met Soc/Stats Assn 1-Day Bus Trip to 4IMSC

Tuesday (after Easter) 28 March 1989

- Programme arranged to suit particular interests.
- Conference dinner with invited speaker, **Dr Kenneth Hare**, Professor Emeritus in Geography, University of Toronto IMO International Prizewinner 1988 Companion, Order of Canada.
- A chartered coach travelling via

<i>Auckland Univ</i>	<i>Waikato Univ</i>	<i>Rotorua</i>
<i>0715</i>	<i>0845</i>	<i>1015</i>
<i>2400</i>	<i>2200</i>	<i>2100</i>

would cost \$25 per return seat (if bus full).
- Total cost including travel, morning/afternoon teas, dinner (incl. wine), registration for sessions 3 & 4 and printed materials approx \$60.

Contact : *John Revfeim* or *Stephen Goulter*,
c/- P.O. Box 722,
Wellington (04)729-379.

or *Prof Alastair Scott*,
Auckland University, 62-889.

Dr Murray Jorgenson,
Waikato University, 774-831.

NEW ZEALAND COMPETES AT THE 29TH INTERNATIONAL MATHEMATICAL OLYMPIAD

The team was comprised of David Wallace, Rongotai College; Karl Tomlinson of Edgewater College; Rodger Tiedmann of Auckland Grammar; John Marshall and William Jones of Logan Park HS and Roger Beggs of Naenae College. Professors Holton (Otago) and Hookings (Auckland) were team leader and deputy and Mr Alan Parris, Linwood HS was observer/manager. Mr Gus Gale of Hornby HS was an additional observer once the meeting of Australian Mathematics Competition organisers was completed.

It was gratifying that David Wallace gained a silver medal and that the team's placing was 34th out of the 49 competing nations. The only 'first-timers' to be placed higher than the NZ team were the Singaporeans, so that the challenge now is to progress further up the list. However it is highly dependent on the brilliance of the individual team members; identifying and motivating the really talented youngsters is the task for the NZ Mathematical Olympiad Committee, not to mention raising the funds to send teams to future Olympiads.



Pictured from left to right: John Marshall, William Jones, Rodger Tiedeman, Gordon Hookings, Alan Parris, Roger Beggs, David Wallace, Karl Tomlinson

New Zealand Statistical Association (Inc)

1988 Publications Catalogue

Statistics at Work (1982; edited by S. Gubbins, D.A. Rhoades and D. Vere-Jones) \$13.50

A handbook of statistical studies for the use of teachers and students. Includes eleven case studies accompanied by exercises, numerous references for further reading together with suggestions for class work and projects. Illustrates the practical importance of statistical ideas in a range of applications in a New Zealand context.

StatLab (1987; by W. Douglas Stirling)
(NZ or US) \$99.00

StatLab is a computer program for teaching statistical concepts to students in introductory statistics courses. StatLab runs on the Apple Macintosh, and covers most topics in such courses and can be used by students in practical classes or by teachers in classroom demonstrations. It is sold with a 180-page book containing detailed instructions for 16 practical classes and a full manual about the program. Site licenses are available.

Understanding Surveys (1988; edited by V. Duoba and J.H. Maindonald) \$10.00

This booklet provides a non-technical introduction to sample surveys and the many ways in which surveys are used. The focus is on the design of a survey and on the collection of survey data. It has been adapted for New Zealand needs from a document prepared by the American Statistical Association and contains many examples of New Zealand surveys. It includes exercises and can be used in statistics, social science and other courses to give students a brief introduction to sample surveys.

Quotes, Damned Quotes, and ... (2nd edition 1986; compiled by John Bibby) \$7.00

An anthology of sayings, epithets, and witticisms - several of them something to do with statistics!

Notes Towards a History of Teaching Statistics (1986; by John Bibby) \$12.50

This book examines the development of a subject and the evolution of a profession. Three key themes relate to the institutional development of numeracy, continual "identity crises" in statistics, and the agonising emergence of a new profession. These themes are illustrated using a wide variety of episodes including Florence Nightingale's designs for an Oxford professor, Karl Pearson, and many, many more. Useful historical background.

Further information on these publications can be obtained from NZSA Publications, Department of Mathematics and Statistics, Otago University, PO Box 56, Dunedin.

NZSA Membership

Applications are invited from any persons, firms or organisations interested in furthering the aims and objectives of the Association.

For further information write to the Secretary, New Zealand Statistical Association (Inc), PO Box 1731, Wellington.

MEMBERSHIP APPLICATION

The Secretary
New Zealand Statistical Association (Inc)
PO Box 1731
WELLINGTON

I wish to join the New Zealand Statistical Association (Inc).

Name:.....

Address:.....
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Occupation:.....

Membership category:
(Ordinary, Corporate, Student, Library).....

My membership subscription is enclosed.

Signature:.....

Date:.....

The 1988/89 subscription rates are \$35 (Ordinary), \$70 (Corporate), \$17.50 (student), \$35 (Library).

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