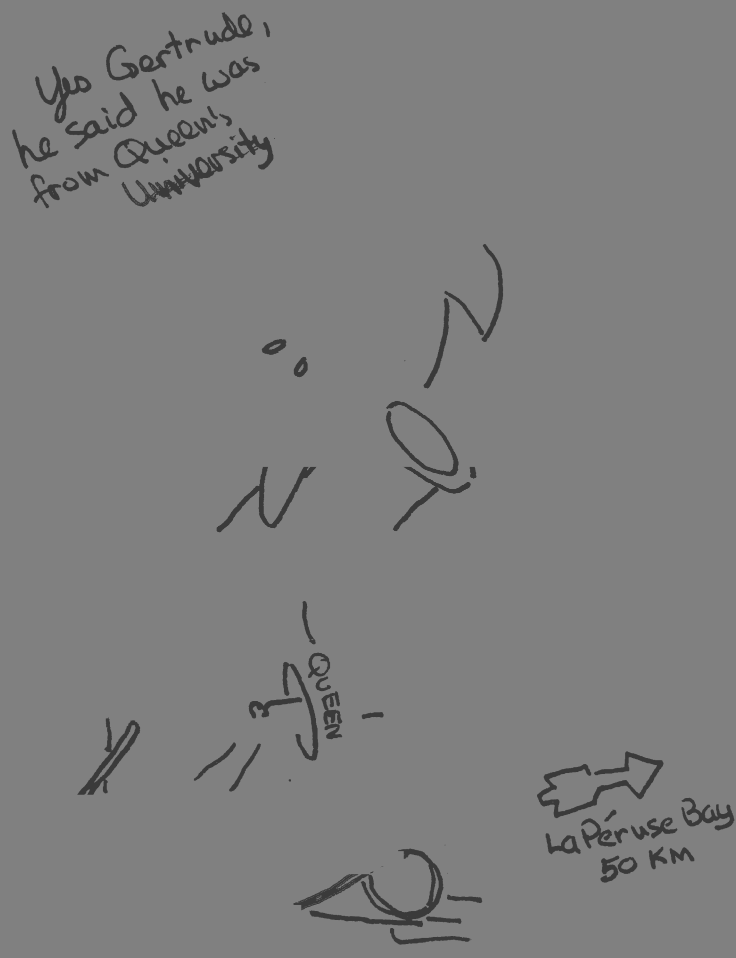

An aperiodical issued at Kingston, Ontario by the
Department of Mathematics and Statistics, Queen's University

Communicator, we are launching an effort to communicate with our former students and with teachers of mathematics.

The Communicator should serve several purposes all

John Coleman

BIOMATHEMATICS AT QU

(In recent years there has been increasing collaboration between the Biology and Mathematics Departments. Joan Geramita describes

below some of the background and consequences of this development, in which both she and Peter Taylor have taken an active part.)

Historically, mathematicians, chemists and physicists have collaborated on problems presented by the "real" world. In fact, in past centuries, there were no physicists or chemists or mathematicians; there were just scientists with interests in one

or another area of knowledge. Due to this history of interaction, mathematicians have tended to regard problems generated by biology as being too complicated for meaningful analysis by the mathematics available. Of course, statistics has always been regarded by to join them for their weekly colloguium series. A weekly BioMath seminar has been instituted to discuss topics in biology which appear in the literature with a mathematical presentation. This seminar provides biologists with an opportunity to learn about the

And soon the fourth, fifth, sixth telephones were added, and a problem was identified. How should all of these telephones be connected to allow any one of them to communicate

If all telephones were to be directly connected to each other, a result from COMBINATORICS says that the number of pieces of wire would have to be $n(n-1)/2$, where n is the number of telephones. There are about 15,000,000 telephones in Canada alone in 1979; this means that about 112,000,000,000,000 pieces of wire would be needed if the original connection process had been continued.

MANY TELEPHONES CONCENTRATION FEWER LINES

Initially, this concentration was provided by operators; it is now done by sophisticated switching machines.

A problem then arose in PROBABILITY: how many lines

are required to serve a certain number of telphones, making sure that all telephone users can have access to a line almost every

Since leaving Queen's in 1970 with a Ph.D. in Mathematics, I have worked at Bell-Northern Research in Ottawa. BNR is a [redacted] wholly-owned subsidiary of Bell Canada, and of Northern Telecom. Bell Canada is the largest telecommunications carrier in Canada, serving over 8,000,000 telephones as well as data and video customers, and Northern Telecom is a world-wide manufacturer of [redacted]

A CURRENT PROBLEM

Submitted by Ron Horn, BNR, Ottawa

(In order to visualize the problem, one would be advised to consider [redacted]

[redacted]

For $N = 1$, the problem has been solved by A.K. Erlang (among others). The solution procedure is as follows (assume $m_1 = 1$ [redacted]

1) Consider extremely small time intervals.

[redacted]

3) (Cont'd)

- the probability of starting in state j and moving to state $(j-1)$ is $j\mu_1 P(j)$
- the probability of starting in state j and remaining in state j is

$$(1-\lambda_1-j\mu_1)P(j) \;.$$

4) The expressions above may be restructured to derive the [redacted]

$$P(K) = \lambda_1 P(K-1) + (K+1)\mu_1 P(K+1)$$

$$+ (1-\lambda_1-K\mu_1)P(K)$$

5) The above system yields M equations (nontrivial) in $M + 1$ [redacted]

7) The solution to the equations yields

$$P(M) = \frac{\frac{A^M}{M!}}{\sum_{j=0}^{M} \frac{A^j}{j!}} \qquad \left(A = \frac{\lambda}{\mu}\right)$$

[redacted]

THE ACAP ASSESSMENT

The independent assessment of the Mathematical Sciences in Ontario by the ACAP Committee - (eleven out-of-province internationally known mathematicians, statisticians and computer scientists) gave very high marks to our group of statisticians:

"The faculty in statistics at Queen's are of good quality; they are proceeding in a thoughtful, steady manner.

The STATLAB provides a valuable statistical service that might well be imitated by other universities. It is an integrating force for the statisticians and it provides educational opportunities

PEOPLE IN THE NEWS

Jon Davis has served for three years as editor of IEEE Transactions on Control. It is a great honour for anyone so young to be asked to take on this important task. It means that he is absolutely up to date (even a year ahead of published research) [illegible]

on the most sophisticated aspects of Control Theory. [illegible]

PROBLEM

Submitted by Peter Taylor

Suppose we have p standard coins, all identical except that one has a different weight from the others. We wish to use a simple balance to find the non-standard coin. Assume we have an inexhaustible supply of standard coins which [illegible] we can use in the weighing.

Let $Q(n)$ be the maximum value of p for which the problem can be solved in n weighings.

To get a feeling for the problem discover that [illegible]

[illegible]

of this problem?