

## CONTENTS

### News and Announcements

Page

3

### Articles

An Introduction to Sparse Matrices	<i>D. O'Connor</i>	6
An Introduction to Nonstandard Analysis	<i>C. Thompson</i>	31
Integral Means of Univalent Functions - A Fragment	<i>T. Holland</i>	42
A Note on a Comment of Axler and Shapiro	<i>M. O'Searcoid</i>	52
Playing the Numbers Game in New York	<i>G. Kelly</i>	57
Drawing the Line at the Fourth Dimension	<i>"Guardian"</i>	62

### Teaching Notes

Eigenvectors and Diagonalization	<i>P.D. Barry</i>	65
----------------------------------	-------------------	----

### Problem Page

69

### Books Received

73

### Book Reviews

75

### Conference Report

82

## NEWS AND ANNOUNCEMENTS

### DUBLIN INSTITUTE FOR ADVANCED STUDIES

10, Burlington Road, Dublin 4

### *Mathematical Symposium*

Thursday 19 December, 2.30 - 5.00

Friday 20 December, 10.00 - 5.00

### IRISH MATHEMATICAL SOCIETY

### *General Meeting*

Friday 20 December, 12.15 pm

at

Dublin Institute for Advanced Studies

## NOTICE

### The John L. Synge Award

The Mathematics Division of the Royal Society of Canada has decided to raise funds to establish an award for outstanding contributions to the Mathematical Sciences, to be awarded at regular intervals, not necessarily to a Fellow of the Society.

There is such an award in Physics and in Chemistry; both of these awards are named after Rutherford, they are awarded every year if suitable candidates are available, and each of them consists of a Medal and a cash award of \$1,500.

We hope that the Mathematics award will be of the same nature but all depends on our success in raising funds. In any case the award will be named in honour of John L. Synge, who was elected to the Royal Society of Canada more than 50 years ago and who was the first recipient of the Henry M. Tory Gold Medal of the Royal Society of Canada.

Prof. Synge, now resident in Dublin, Ireland, was for many years Professor of Applied Mathematics at University of Toronto.

Persons and organizations are invited to contribute to the proposed John L. Synge award. Cheques should be made payable to:

The Royal Society of Canada, John L. Synge Award  
and sent to Professor Israel Halperin, Chairman of the John L. Synge Awards Committee, Department of Mathematics, University of Toronto, Toronto, Ontario M5S 1A1, Canada.

Income Tax Deductible (in Canada) Receipts will be given by The Royal Society of Canada.

## CONFERENCE ANNOUNCEMENT

### PRELIMINARY ANNOUNCEMENT

#### CONFERENCE

#### ON

#### ASPECTS OF ANALYSIS

\*\*\*\*\*

A conference, spread over two days, will be held at University College, Cork, in mid-May, 1986. It should appeal to workers in OPERATOR THEORY and FUNCTION THEORY.

The registration fee will be IR£10.00 (ten Irish punts). Assistance in arranging accommodation will be provided, if required.

Further information may be obtained from Professor Finbarr Holland, Department of Mathematics, University College, Cork, Ireland.

\*\*\*\*\*