

THE AUSTRALIAN NATIONAL UNIVERSITY

FACULTY OF ARTS, S.G.S

DEPARTMENT OF APPLIED MATHEMATICS

ANNUAL REPORT 1968

Staff

Prof. A. Brown
Mr J.E. Drummond (Reader)
Dr J.C. Burns (Reader)
Mr S.M.A. Meggitt (Senior Lecturer)
Mr H.F. Petersons (Lecturer)
Mr R.L. Agacy (Temporary Lecturer)
Mr D.B. Shield (Tutor)
Mrs G.L. Downes (Research Assistant)
Mrs B. Hawkins (Secretary).

Dr Burns was on study leave throughout the year and permission to appoint a temporary lecturer in his place was obtained too late to obtain a suitable replacement from outside the university. Instead, Mr Agacy acted as Temporary Lecturer and Mr Shield took over most of the responsibilities that would normally have been carried by Mr Agacy (as Senior Tutor). We were able to use a small portion of the savings made possible by this arrangement to appoint a part-time tutor, Mr G. Delic, who looked after two of the first-year tutorial classes.

During his study leave, Dr Burns worked at the Institute for Fluid Dynamics and Applied Mathematics, University of Maryland, until the end of July. He completed the year at Imperial College, University of London, where he worked with Professor M.J. Lighthill. While in England, he was able to attend the Osborne Reynolds centenary symposium at the University of Manchester.

Development of Department.

The arrival of the first cohort of students trained under the Wyndham Scheme presented us with some problems in our first-year teaching and we are not certain that we have solved these problems completely, although the results at the end of the year were reasonably good.

Our principal concern, as in previous years, has been to provide a sound undergraduate course for our students which will enable them to make use of mathematics effectively when they leave the university. We feel that we can best achieve this aim by teaching each year of the course as a whole, with a fairly broad coverage of topics at each stage, rather than by splitting the year's work into three or four independent sub-units.

We look forward with apprehension to the introduction of a semester system in the Faculty of Science in 1969, while our own Department and other Faculties are still working on a different system. With some of our students working under one system and some working under the other, it seems inevitable that our teaching will suffer.

The department's research interests continued to be in the field of fluid dynamics and allied problems. Mr Meggitt continued his calculations on the evolution of massive stars, using models composed initially of pure hydrogen. His procedure has been to follow the gravitational contraction of these stars until the temperature and pressure rises sufficiently for nuclear energy to be produced. Continuing these calculations after nuclear energy production becomes important, he has checked the stability of the system at each stage. It was expected that stars with a total mass about 100 times that of the Sun would become unstable but Mr Meggitt's calculations do not show this effect.

During the year, Mr T. Parkes and Mr J.O. Murphy completed their M.Sc. theses successfully.

Enrolments and Examination Results.

A table of enrolments and examination results is given at the end of this report. With the small numbers involved in the second and third year classes, percentages are liable to be misleading so only the number of students in each category has been tabulated. Of the 24 students who withdrew from Applied Mathematics I, the majority were part-time students and only six were students who had taken the N.S.W. Higher School Certificate last year. Thus the larger number of withdrawals than usual in this unit does not appear to be connected with the arrival of students trained under the Wyndham Scheme.

Publications

- *Andrew, A.L., A note on the Ritz method with an application to overtone stellar pulsation theory. Journal of the Australian Mathematical Society, Vol 8, Part 2, pages 275-286, 1968.
- Brown, A., A logging problem. The Australian Mathematics Teacher, Vol.24, No. 2, pages 57-59, 1968.
- Burns, J.C., Generalized Weinstein correspondence principle, Technical Note BN-552, Institute for Fluid Dynamics and Applied Mathematics, University of Maryland, June, 1968.
- Burns, J.C., A general circle theorem, Technical Note BN-562, Institute for Fluid Dynamics and Applied Mathematics, University of Maryland, August, 1968.
- Burns, J.C., How long is a piece of string, Mathematical Gazette, Vol.52, pages 14-16, 1968.
- Burns, J.C., Differential equations for flow of a solution of varying concentration, American Mathematical Monthly, Vol.75, No.7, pages 705-710, 1968.
- Murphy, J.O., Anharmonic Oscillations of Massive Stars, Proceedings of the Astronomical Society of Australia, Vol.1, No.3, pages 88-89, 1968.
- Murphy, J.O., Non-linear Adiabatic Pulsations of Massive Stars, Aust.J. Phys. Vol.21, No.4, pages 465-473, 1968.
- *Van der Borcht, R. and Murphy, J.O., Anharmonic pulsations of an early main-sequence star, Monthly Notices of the Royal Astronomical Society, Vol.131, pages 225-235, 1966 (omitted from 1966 list of publications).

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Enrolments and Examination Results

Subject or unit	2. Enrolled	3. Sitting	4. High Distinction	5. Distinction	6. Credit	7. Pass	8. Fail	9. Wastage	10. Failure plus wastage
Applied Maths I No.	82	58	3	7	11	25	12	24	36
Percentage	100	71	4	9	13	30	15	29	44
App. Maths II	22	18	-	1	4	10	3	4	7
App. Maths II (Hons)	6	3	-	-	3	-	-	3*	3
App. Maths III	17	16	-	2	3	10	1	1	2
App. Maths III (Hons)	4	4	-	4	-	-	-	0	0

Includes one student transferred to Applied Mathematics II.

	Enrolled	Sitting	Results
Final Honours	1	1	First Class honours
Masters Qualifying	1	-	-
Masters Degree	3	-	Two completed degree
Ph.D.	1	-	-