The year 1972 saw further development of the College towards autonomy.

An Act to establish the University of Wollongong was passed by the New South Wales State Parliament and a possible academic structure for the future University of Wollongong was formulated. Five new professorial positions - Accountancy, Geography, Geology, Psychology and Physics - have been advertised and will be filled during 1973.

For the first time, the Australian Universities Commission recommended that the College be treated as a separate institution for funding in the 1973-75 triennium. This increasing responsibility for financial affairs has produced a need for additional administrative staff and a growth in administrative functions.

During the year work continued on Stage I of the Science Building and approval has been given for planning to commence for the Library Building Stage II and the Social Science Building.

C.A.M. Gray,
WARDEN.
# CONTENTS

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A number of research projects attracted financial support. Grants and donations received during 1972 were:

1. Monsanto Australia Limited (Professor B. Halpern) $500
2. Australian Research Grants Committee - Screening for metabolic disorders by gas-liquid chromatography and mass spectrometry (Professor B. Halpern). $53,516
3. Australian Research Grants Committee - Substituent effects in acid ionization processes (Associate Professor P.D. Bolton and Dr. F.M. Hall). $8,975
4. Australian Research Grants Committee - Desulphurisation of thiocarbonyl compounds (Dr. J. Ellis). $591
5. Reserve Bank of Australia - Macroeconomic study of coal production in New South Wales and Queensland (Mr. B.W. Ross). $10,000
6. Illawarra Regional Development Committee - Studies of: population and work force; migrant employment; regional income generation; education and employment opportunities (For studies supervised by Professor K.A. Blakey, Mr. J.C. Steinke and Dr. S. Ali.). $7,000
7. State Planning Authority - Studies of: Lake Illawarra; residential development; urban property values (For studies supervised by Professor K.A. Blakey and Mr. D.R. Gallagher). $2,000
8. Shoalhaven Shire Council - Economic evaluation of flood mitigation works on the Shoalhaven River (Mr. D.R. Gallagher). $6,000
10. Water Research Foundation of Australia - Study and investigation of water pollution at coal washeries (Dr. R.T. Wheway). $4,000
11. Water Research Foundation of Australia - Improvement in flocculation and settlement of insoluble solids in process waters (Dr. R.T. Wheway). $2,000
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<td>Australian Institute of Nuclear Science and Engineering</td>
<td>Work on boiling heat transfer (Associate Professor S.E. Bonamy)</td>
<td>$200</td>
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<td>13.</td>
<td>Australian Research Grants Committee</td>
<td>Micro-area boundary probe for investigation of discontinuities in negative corona (Mr. O.J. Tassicker)</td>
<td>$3,020</td>
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<td>Electrical Research Board</td>
<td>Electro-mechanical energy converters (Professor B.H. Smith)</td>
<td>$3,000</td>
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<td>15.</td>
<td>Electrical Research Board</td>
<td>Optimisation of distribution systems (Dr. K.J. McLean and Dr. G.W. Trott)</td>
<td>$200</td>
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<td>16.</td>
<td>Electrical Research Board</td>
<td>Electric vehicles (Professor B.H. Smith)</td>
<td>$500</td>
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<td>17.</td>
<td>Australian Research Grants Committee</td>
<td>The mechanical behaviour of sheet metals (Professor G. Brinson and Mr. M. Atkinson)</td>
<td>$4,600</td>
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<td>18.</td>
<td>Australian Research Grants Committee</td>
<td>A collection of writings on satire and a critical account of attitudes to satire from the sixteenth century to the present (Professor P.K. Elkin)</td>
<td>$1,500</td>
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<tr>
<td>19.</td>
<td>Nuffield Foundation</td>
<td>(Dr. A.J. Wright)</td>
<td>$4,450</td>
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<td>20.</td>
<td>National Coal Research Advisory Committee</td>
<td>(Associate Professor A.C. Cook)</td>
<td>$6,000</td>
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<td>21.</td>
<td>Australian Research Grants Committee</td>
<td>Thermal history of the Sydney basin - a study of coal rank and mineralogical indications of thermal regimes related to cover depth of basement, nature of basement, and intensity of magmatic activity (Associate Professor A.C. Cook, Dr. E.R. Phillips and Dr. R.A. Facer)</td>
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<td>22.</td>
<td>Australian Research Grants Committee</td>
<td>Devonian macrofossil biostratigraphy of the Lachlan geosyncline (Dr. A.J. Wright)</td>
<td>$1,000</td>
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<td>23.</td>
<td>Australian Research Grants Committee - Queuing models and the evaluation of port capacity (Mr. K.P. Tognetti and Dr. R. Robinson).</td>
<td>3,350</td>
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<td>25.</td>
<td>John Lysaght (Australia) Limited - Industrial accident research (Mr. N. Adams).</td>
<td>4,500</td>
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<td>26.</td>
<td>Australian Research Grants Committee - Learning rates using unisensory and bisensory presentation of information (Dr. D.D. Diespecker).</td>
<td>1,041</td>
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<td>27.</td>
<td>Wollongong City Council - Contamination of soil and herbage by trace elements (Dr. F. Beavington).</td>
<td>200</td>
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Total: 140,961
DIVISION OF BIOLOGICAL AND CHEMICAL SCIENCE

Head of Division: Professor B. Halpern,
BSc (Syd.), PhD (Lond.),
ARACI

ACADEMIC STAFF

Department of Chemistry

Professor
B. Halpern, BSc (Syd.), PhD (Lond.), ARACI

Associate Professors
P.D. Bolton, BSc (Exon.), PhD (Lond.), ARIC, FRACI
E. Gfellert, DrPhil (Basle), FRACI

Senior Lecturers
F.M. Hall, MSc PhD (N.S.W.), ASTC, ARACI
E. Kokot, BSc PhD (N.S.W.), ASTC, ARACI

Lecturers
J. Ellis, BSc (Syd.), PhD (N.S.W.), ARACI
W.K. Hannan, MSc (Syd.)
G.M. Mockler, BSc PhD (N.S.W.), ARACI

Senior Tutors
D.J. Campbell, BSc DipEd (Tas.)
(General and Human Biology)
R. Rudzats, MSc PhD (N.S.W.), ASTC, ARACI, ARIC

Post-doctoral Fellow
J.P. Warren, BSc PhD (Melb.), ARACI
(commenced duty October 1972)
HIGHER DEGREE TOPICS

Department of Chemistry
Doctor of Philosophy

Catalytic Deuterium Exchange Reactions Between Alkylbenzenes.
W.K. Hannan - enrolled 1966. Supervisors - Associate Professor J.K. Garnett and Associate Professor E. Gellert.

The Constituents of Schefferomitra and Boletus Species from New Guinea.

The Alkaloids of Some Australian and New Guinea Plants.

Physiological Aspects of Acoustic Behaviour in Crickets.
D.J. Campbell - registration transferred from M.Sc. to Ph.D. effective from 2nd term 1966. Supervisor - Dr. E. Shipp.

A Kinetic Study of the Hydrolysis of N-Alkyl Acetamides.

Substituent Effects on the Thermodynamic Functions of Ionization of Benzoic Acids.
Thermodynamic Constants of Ionisation and Hydrolysis of Organic Compounds.

Screening for Metabolic Disorders by Gas-liquid Chromatography and Mass Spectrometry.

Stereospecificity of Some Enzyme-Catalysed Hydrolysis Reactions.
J. Das - enrolled 1972. Supervisors - Professor B. Halpern and Associate Professor P.D. Bolton. Dean's Award.

The Use of Aldehyde and Ketones as N-protecting Groups for Amino Acids in Peptide Synthesis.

Screening for Metabolic Disorders by Gas-liquid Chromatography and Mass Spectrometry.

Master of Science
Thermodynamic Functions of Ionisation Processes.
J. Kudrynski - enrolled 1968. Supervisor - Associate Professor P.D. Bolton.

Hydrolysis of Amides - A Kinetic Study of Substituent Effects on the Dilute Acid Hydrolysis of N-substituted Acetamides.
The Magnetic and Chemical Behaviour of some Polynuclear Methoxide Complexes of Iron (III) Carboxylates.
Supervisors - Dr. G. Mockler and Dr. E. Kokot.

Constituents of Plants of the Family Asclepiadaceae.
A.G. Duff - enrolled 1970. Supervisors - Associate Professor E. Gellert and Dr. R. Rudzats.

An Investigation of the Infra Red Spectra of Some Transition Metal Schiff Base Complexes.

Preparation of Isotopically Labelled Organic Nitrogenous Compounds.
J. Robson - enrolled 1970. Supervisors - Associate Professor E. Gellert and Dr. J. Ellis.

Desulphurization of Thiocarbonyl Compounds.
R.A. Schibeci - enrolled 1970. Supervisor - Dr. J. Ellis.

A Physico-Chemical Investigation of Some Transition Metal Complexes.

Computer Techniques in Chemistry.
E.J. Hanson - enrolled 1971. Supervisor - Associate Professor P.D. Bolton.

Studies in Isotopic Labelling of Amino Acids and Polypeptides.
S. Murray - enrolled 1971. Supervisor - Mr. W.K. Hannan

Water Pollution Studies on Lake Illawarra.
S. Kanamori - enrolled 1972. Supervisor - Dr. J. Ellis.
Dean's Award.
1. **Natural Products**: Phytochemical investigation of the Australian and New Guinean flora, in conjunction with the Australian Phytochemical Survey, is concerned with the isolation and identification of constituents with physiological and pharmacological activity. Plants belonging to the families of Lauraceae, Annonaceae, and Asclepiadaceae and the fungus Boletus because of its alleged activity on the human brain, have been investigated.

2. **Synthetic Organic Chemistry**: The development of new synthetic methods and syntheses of analogues of compounds with known antitumour and related activities are carried out in order to develop new drugs and to correlate physiological activity with chemical structure.

3. **Physical-organic Chemistry**: (a) Kinetic studies of the acidic and alkaline hydrolysis of several series of aliphatic amides and ortho-substituted aryl esters have been made. Various linear free energy relationships are being used to assess the influence of substituents upon the rates, activation energies and entropies of these reactions.

   (b) Thermodynamic acidity constants of a wide range of substituted phenols, anilinium ions and benzoic acids have been measured by a spectrophotometric technique over a range of temperature, and values of the enthalpy and entropy of these ionization processes computed. These values are also being assessed in terms of linear free energy relationships and certain molecular orbital calculations.
4. **Chemistry of organic sulphur compounds:** The chemistry and photochemistry of thionoesters and other organic sulphur compounds is being studied and their use as intermediates in organic synthesis is being examined.

5. **Inorganic Chemistry:** Spectro- and magnetochemical studies of (a) first row transition metal and lanthanide complexes of polydentate ligands including Schiff bases.

   (b) Polynuclear complexes of first series transition metals with benzimidazole derivatives, Schiff bases, β-diketones, carboxylic acids and alkoxides.

6. **Catalytic Exchange Processes:** Investigation into relative activities of Group 8 transition metals as heterogeneous catalysts in isotopic exchange reactions of a range of aromatic hydrocarbons, heavy water being used as a source of deuterium. The aim is to investigate the mechanisms of exchange reactions and in particular to test the worth of the Π complex absorption mechanism.

7. **Analytical Chemistry:** (a) The determination of the configuration of asymmetric compounds by gas chromatography and mass spectrometry of Diastereoisomers is being studied.

   (b) The circulation of water in Lake Illawarra is being studied and a water quality monitoring program established.

   (c) Procedures for the screening of metabolic fluids by gas liquid chromatography and mass spectrometry are being evaluated.
8. **Peptide Chemistry:** A study of the use of ketimine derivatives of amino acids in peptide synthesis is in progress.

9. **Computers in Chemistry:** (a) Applications of on-line digital computers to chemical problems with particular reference to low resolution mass spectroscopy.
   
   (b) The application of digital computers to the solution of physical and theoretical chemical problems.

10. **Biology:** Factors influencing the development of spatial pattern and swarming in field populations of the cricket *Teleogryllus commodus* are being investigated. Infradian cycles of activity and acoustic and pheromonal signalling are receiving particular attention.

**PUBLICATIONS**

**Department of Chemistry**


DIVISION OF COMMERCE

Head of Division: Professor K.A. Blakey,
BA (N.Z.), MSc (Lond.),
MCom (Melb.), DPhil (Oxon.)

ACADEMIC STAFF

Department of Accountancy

Acting Head of Department and Lecturer
R.K. Wilson, BCom (N.S.W.)

Lecturer
B.H. Andrew, BCom (N'cle) (appointed February 1972)

Tutor
A.J. Anderson, BCom (N.S.W.)

Department of Economics

Professor
K.A. Blakey, BA (N.Z.), MSc (Lond.),
MCom (Melb.), DPhil (Oxon.)

Senior Lecturer
J.C. Steinke, MA (Calif.)

Lecturers
S. Ali, MCom (Melb.), DEc (Hasanuddin)
D. Gallagher, BAgEc (N.E.)
Mrs. Juli Irving, BA (N.S.W.) (appointed February 1972)

Tutors
R.G. Castle, MEd (Syd.)
S.C. Mares, BEd (Prague) (appointed February 1972)
M.J. Ross, BA (N.S.W.) (appointed April 1972)
Higher Degree Topics

Department of Economics

Doctor of Philosophy

The Tertiary Sector in an Industrial Economy.
Mrs. J. Irving - enrolled 1969. Supervisors - Professor K.A. Blakey and Mr. J.C. Steinke.

A Study of the Effect of Overall System Costs on the Investment Decision in Electricity Generation.
B.W. Ross - enrolled 1969. Supervisors - Professor K.A. Blakey and Mr. J.C. Steinke, Deans's Award.

Decentralization in Australia.
J.C. Steinke - enrolled 1969. Supervisor - Professor K.A. Blakey.

Economic Implications of Particular Systems of Financing Local Government Expenditures in Urban Areas.
R. Castle - enrolled 1972. Supervisor - Professor K.A. Blakey.

Land Values.

Master of Commerce

Some Economic Aspects of Australian Immigration.
S. Mares - enrolled 1972. Supervisors - Professor K.A. Blakey and Mr. J.C. Steinke.

Some Economic Aspects of Outdoor Recreations.

Residential Location and Journey to Work.
Economics of Land Values.

A Comparison of Trends in Local Government Finance between City of Wollongong and other selected Local Government Regions.

Output of the Secondary School System related to Job Opportunities.
C.W. Taylor - enrolled 1972. Supervisor - Professor K.A. Blakey.

STAFF RESEARCH ACTIVITIES

Department of Accountancy
Investigations of accounting practices in several foreign countries (Germany, U.S.S.R., Yugoslavia, Britain and the E.E.C.) were carried out. Research has commenced in the areas of accounting for the costs of superannuation schemes in Australia and the problems of currency translation in the financial reports of multinational corporations.

Department of Economics
Research activity included the following studies:
Public expenditure on welfare services and its function in the Australian economy; economic analysis and the service economy; inflation in conjunction with tendencies towards stagnation in the Australian economy; new developments in Australian monetary policy; theoretical implications of the use of price as a basis for anticipated utility; decentralisation and land values; financing local government services; the relationship between residential capital improvements and unimproved capital values.
Systems costs and the investment decision in power generation; the coal industry of New South Wales and Queensland; economies of scale in coal mining in New South Wales; an application of linear programming in the management of production in a coal mine.

Possible solutions by public transport of some problems related to journeys to work and shopping trips in Wollongong; the development of Port Kembla; population and employment in the Illawarra District; the evaluation of demand for public recreational facilities in the City of Wollongong; the future use of the resources of Lake Illawarra.

PUBLICATIONS *

Department of Economics


* Wollongong University College Publications are listed on pages 66-97.
DIVISION OF ENGINEERING AND METALLURGY

Head of Division: Professor G. Brinson,
MSc (Melb.), PhD (Sheff.),
FIM, MAusIMM

ACADEMIC STAFF

School of Civil, Mechanical and Mining Engineering

Professor, Head of School and Head of Department of Structural Engineering
C.A.M. Gray, Hon.JMN, BSc ME (Syd.), CEng, FAIM,
FIMechE, MICE, MIEAust, Emeritus Professor,
University of Malaya

Department of Structural Engineering

Senior Lecturer
R.W. Upfold, ME PhD (N.S.W.), ASTC, CEng,
MIEAust, MIMechE

Lecturers
R.N. Chowdhury, BSc (Eng) (P.G.D.), PhD (Liv.),
CEng, MICE (commenced duty in September 1972)
M.J. Lowrey, ME (N.S.W.), ASTC, MIEAust
G. Singh, BSc (Engg) (Allg.), MSc PhD (Birm.),
AMInstHE, MASEE

Department of Systems Engineering

Acting Head of Department and Associate Professor
A.W. Roberts, BE PhD (N.S.W.), ASTC, CEng, MIEAust,
MIMechE

Senior Lecturer
P.C. Arnold, BE PhD (N.S.W.), CEng, MIEAust, MIMechE
Department of Thermal Engineering

Acting Head of Department and Associate Professor
S.E. Bonamy, BE (Syd.), MSc (Birm.), PhD (N.S.W.), ASTC, CEng, FIMechE, FIEAust

Senior Lecturer
P. Van der Werf, ME PhD (N.S.W.), ASTC, MIEAust

Lecturer
R.T. Wheway, BE PhD (N.S.W.), GradIEAust, MAWWA

Department of Electrical Engineering

Professor
B.H. Smith, BE PhD (Adel.), CEng, MIEE

Senior Lecturers
W.H. Charlton, BE (N.S.W.), ASTC, CEng, MIEE, MIEAust
Z. Herceg, DiplEng (Zagreb), PhD (N.S.W.), MIEAust, MIREE
K.J. McLean, ME (N.Z.), BD (Melb.Div.Coll.), PhD (N.S.W.), MIEAust
O.J. Tassicker, MEE (Melb.), FIEAust, FIEE

Lecturer
G.W. Trott, BSc BE (Adel.), PhD (Alta.), MIEEE

Department of Metallurgy

Professor
G. Brinson, MSc (Melb.), PhD (Sheff.), FIM, MAusIMM

Associate Professor
N. Standish, MSc (N.S.W.), PhD (Otago), ASTC, AMAusIMM (promoted January 1972)

Senior Lecturer
N.F. Kennon, MSc PhD (N.S.W.), FRMTAC, AIM, AMAusIMM

Lecturers
M. Atkinson, BSc (Eng) (Lond.)
T.W. Barnes, MSc (N.S.W.), ASTC, AIM
G.W. Delamore, BSc PhD (Birm.)
    (commenced duty in March 1972)
D.P. Dunne, BSc PhD (N.S.W.), AIM
N. Salasoo, BSc (N.S.W.), MSc (Pitt.), ASTC, AMAusIMM
School of Civil, Mechanical and Mining Engineering

**Doctor of Philosophy**


M.J. Lowrey - enrolled 1972. Supervisor - Associate Professor A.W. Roberts.

Identification and Optimization of Bulk Granular Materials Handling Systems.

Boiling Heat Transfer.

**Master of Engineering Science**

Investigation of Stress Distribution at Changes of Section of Members under Two Dimensional Bending and Direct Stress.

An Investigation of the Stiffness of a Plate Web Girder under Eccentric Loads Applied to a Flange.
Investigation of Design Methods for Bulk Transport Containers.

Dynamic Analysis of the Motion of Linkages with Relation to the Upper Extremity Limb.
N.T. Hodkinson - enrolled 1967. Supervisor - Associate Professor A.W. Roberts.

Optimization of Gears with Particular Reference to Design Parameters.
R.J. Davey - enrolled 1970. Supervisor - Associate Professor S.E. Bonamy.

A programme for the Optimum Design of Short Span Welded Plate Web Girders to A.S.No.CAI.

Project topic not yet determined.

Project topic not yet determined.

Project topic not yet determined.
R. Smith - enrolled 1972.

Project topic not yet determined.

Department of Electrical Engineering
Doctor of Philosophy
Aspects of Forces on Charged Particles in Electrostatic Precipitators.
An Investigation of the Characteristics of Rotating Machines Operated in a Switched Mode.


Master of Engineering
The Thermal Dynamics of a Slab Re-Heat Furnace as required for Automatic Control Purposes.


Control System for a Cold Reduction Steel Mill.

Effect of Voltage Wave Form on Corona Characteristics and Electrostatic Collection of Particles.
Master of Engineering Science

Project topic not yet determined.

Department of Metallurgy

Doctor of Philosophy

The Effect of Oxygen on the Fracture of Iron at Elevated Temperatures.

Assessment of Sheet Metal Formability.

The Effect of Interstitial Solutes on Creep in Zirconium.

Studies in the Distribution of Non-Metallic Inclusions in Metal Ingots.
I.D. Simpson - enrolment changed to PhD 1970. Supervisor - Associate Professor N. Standish.

High Temperature Fracture in Zirconium and its Alloys.

Master of Science

The Effect of Crystallographic Orientation on the Electrochemical Properties of Tin.
N.D. Wiltshire - enrolled 1965. Supervisors - Professor G. Brinson and Mr. B. Harris.

A Study of the Influence of Titanium on the Structure of Alloy Steels.
T.J. George - enrolled 1968. Supervisor - Dr. N.F. Kennon.

Segregation Phenomena in Metal Ingots.
G.G. Lang - enrolled 1970. Supervisor - Associate Professor N. Standish.

Transformation of Austenite during Continuous Cooling.

Velocity Distribution in packed beds of Rectangular Geometry.

Factors Involved in Hot-Topping of Ingots.
J. Wilson - enrolled 1970. Supervisor - Associate Professor N. Standish.

The Role of Nitrides in the Fracture of Ferrous Alloys.

Fluid Flow in Sinter Beds.
L. Munive - enrolled 1971. Supervisor - Associate Professor N. Standish.
Kinetics of Inclusion Growth during Solidification of Metals.

Transformation of Inhomogeneous Austenite.

The Formation of Austenite.

STAFF RESEARCH ACTIVITIES

School of Civil, Mechanical and Mining Engineering

1. Load Distribution in Orthotropic Bridge Decks: A computer programme has been written for the analysis of right orthotropic bridge decks for various load conditions using a Levy-type matrix progression technique. This is being utilized in attempts to develop improved design procedures for such structures.

2. Analysis of Orthotropic Folded Plate Structures: The matrix progression technique is being used to analyse folded plate structures in which elements have orthotropic properties. It is expected that this will lead to a more efficient procedure than the stiffness method of analysis.

3. Engineering Feasibility Study of Bellambi Boat Haven: An investigation has begun for the Illawarra Regional Development Committee into the feasibility of establishing a boat haven for pleasure craft at Bellambi. It is anticipated that the results of the initial theoretical analysis will be tested by a model study.
4. **The Effect of the Coastal Range on Wind:** A Dines' Mk II Pressure Tube Anemometer has been installed at the College's Climatological Station. Continuous records of wind speed and direction obtained from this instrument will be compared with data obtained on similar instruments at Port Kembla and Lake Illawarra. From this comparison, a detailed analysis of the influence of topography on wind will be made.

5. **Improvement of Flocculation and Settlement of Insoluble Solids in Process Waters:** As a result of an initial survey of local industries' water treatment and waste water disposal problems a priority list for research has been established. At present research has been initiated into the suspended solids problems.

6. **A Study and Investigation of Water Pollution Problems at Coal Washeries:** Regular samples of tailings thickener underflows from local coal washeries have been analysed for particle size distribution in both the sieve and sub-sieve range. This analysis is being carried out to enable dewatering equipment to be designed. Such equipment will greatly reduce the possibility of water pollution from washery activity.

7. **Boiling Heat Transfer:** The mechanism of the various stages is being examined, both from a theoretical and experimental point of view, when heat is transferred to a flat surface submerged in a fluid at atmospheric pressure. The inclination of the surface to the horizontal will be varied so that effects of surface tension, bouyancy and other factors on bubble formation may be examined.
8. **Two-dimensional Heat Flow by Conduction:**
   (i) An examination is being made of the temperature distribution in rectangular plates subject to linear temperature gradients on opposite boundaries. Generalized computer programmes applicable to various L/D ratios are being investigated.
   (ii) A study of heat flow through an-isotropic materials of irregular shape is being made using the finite element technique.

9. **Bulk Handling of Granular Materials:** The research programme deals with a number of problems broadly embraced by the analysis of conveyor performance, physical properties of agricultural products, and the mechanics of bulk material flow.
   (i) **Handling and Conveying of Granular Materials**
   Performance analyses and optimization studies of grain handling systems are in progress. This work involves investigations of individual items of plant (conveyors, chutes, etc.) as well as the complete handling system.
   (ii) **Physical Properties of Agricultural Products**
   This research was concentrated in two main areas: Development of recommended techniques for the testing of convex-shaped agricultural products and impact properties of convex-shaped agricultural products.
   (iii) **Flow of Granular Materials**
   Work is continuing on the optimization analysis of the chute flow problem. The recent emphasis in this work has been directed to "flow synthesis", the aim being to establish the form of the chute profile to achieve certain prescribed optimum
conditions such as minimum travel or maximum exit velocity. Pseudo-random test signals are being used as a means of obtaining a detailed knowledge of the dynamic characteristics of the system. In the area of forced flow of granular materials a theoretical model of a single phase column of granular material elevated vertically is being developed to determine the required conveying force and pressure distribution throughout the granular column. Experiments have also been conducted on two phase flows with air as a fluidizing medium. A theory to describe this type of flow is being developed and the feasibility of a solids pump operating at fluidization investigated.

10. Road Materials Research - Skid Resistance: An extensive and intensive study is being made into the frictional characteristics of road pavements. The investigation covers both natural and artificial materials available locally. Also within this study is the design of cement concrete and asphalt mixes with a view to making possible the use of aggregates currently rejected because of their poor wearing quality or their tendency to take a high polish.

British Standard equipment is being used to compile data on skid properties of local pavement surfaces. This data will be useful for the following purposes:

(i) Accident studies and prevention
(ii) Design of horizontal and vertical alignment and design of superelevations on rural and urban roads.

(iii) Design and determination of highway capacity.
(iv) Traffic engineering and control.

A "moving pavement" polishing and skidding simulator is currently being developed to study a broad range of pavement and tyre characteristics at various

...
various environmental conditions. A test trailer for full scale field measurement of skid characteristics is to be developed in future in order that the simulated work in the laboratory will be supplemented and correlated.

11. Materials Research Projects: A number of problems dealing with the strength and properties of materials are under investigation. Tests are being conducted to determine the bond strength of steel and concrete for various coatings and finishes on the steel, including deformation size and geometry. Further work undertaken includes concrete and aggregate testing, unconfined and compaction tests of soils, triaxial tests, testing of failures in concrete, detailed testing of corings from various mines, fatigue testing of ferro-cement.

12. The C.C.T.V. Camera as a Research Tool: Techniques are being developed using the vidicon tube as an image multiplier for photoelastic work. For large scale display of Moire patterns produced in stress analysis work, the C.C.T.V. is being used to give immediate patterns.

13. Stress Analysis Using Holography: A high intensity laser is being used to develop techniques for the measurement of strain in three dimensions.

14. The Analysis of Stress Distribution Produced at Abrupt Changes in Section: The application of the complex variable to the analysis of two dimensional stress systems produced at abrupt changes in section on axially loaded members is being investigated. This method leads to a set of infinite equations in an infinite number of unknowns. Methods for the solution of these equations have been investigated using the College computer.
15. The Investigation of Curvature Produced in Plates with Edge Loading Using Moire Fringe Techniques: The curvature of plates under varying types of loads and edge fixations is being investigated by interpreting Moire fringe patterns. These patterns are produced from a double exposure of reflected line patterns. A large scale apparatus, suitable for large plates, has been constructed and is being used for the study of the orthotropic properties of rolled materials.

16. The Analysis of Whole Stress Fields Under Impact Conditions: Using Moire fringe techniques and high speed photographic equipment, deflections in beams and plates over large areas are being studied. This work is being carried out for impact loading and also cyclic loading.

17. Experimental Analysis of Structures: Scale models of reinforced concrete and steel shell structures are being analysed. Models are also being developed for the teaching of direct and indirect model analysis techniques.

18. The Development of High Speed Photographic Techniques: Various photographic techniques are being developed for the recording on film of dynamic phenomena. Techniques are developed using combinations of ultra high speed cine cameras, high intensity stroboscopes, and single shot cameras.

19. Identification of System Dynamic Characteristics by Cross Correlation Analysis: The natural modes of machines on elastic supports are being determined by the application of pseudo-random perturbing signals and cross correlation analysis. Various methods for performing the correlation analysis are being investigated. Computer simulation studies of system identification investigations are being undertaken.
Department of Electrical Engineering

1. **Automatic Control**: Investigation of computer control of furnaces and rolling mills in the steel industry, investigation of various methods of switched operation of machines, identification of systems using 2-level chain codes and correlation techniques.


3. **Processes in Electrostatic Precipitation**: Interpretation of field testing on precipitators, the performance of full scale plant when operated with high resistivity particles, the formation of reverse ionisation and its effect on precipitator performance, forces of adhesion in agglomerated layers, mechanism of current conduction in the precipitated layer, the effect of emitter geometry on current density and field strength.

4. **Insulating Materials**: The complex dielectric permittivity of powders as a function of frequency and temperature, ionic and electronic conduction in insulators with special reference to the effect of metal electrodes, the force of adhesion between small diameter insulating particles in the presence of an ionic field.

5. **Gaseous Discharges**: Generation and transport of gaseous ions in a corona discharge system with special reference to the influence of the electrode surface condition, feasibility of operation with controlled pulsed a.c. energisation, the complex dielectric permittivity of an ionised gas at various temperatures.
and frequencies, the measurement of the electric fields in a corona discharge by means of a special boundary micro area probe.

6. **Power Systems**: Systems analysis of distribution systems, data acquisition and processing, load characteristics.

**Department of Metallurgy**

1. **Solidification**:

(i) The distribution of inclusions in ingots –
A new approach to the statistical analysis of inclusion distribution in ingots has been developed and applied to both laboratory and industrial ingots. A study of the kinetics of inclusion growth is also being investigated with the aid of this statistical analysis. The influence of convective movement in the melt on inclusion distribution is being examined.

(ii) Solute segregation in ingots –
Studies of solute segregation in solidified salt solutions have shown effects thought to be associated with systems that expand on solidification. These effects are being further investigated using Bi-Zn alloys. A separate study is concerned with the influence of hot-topping on solute segregation.

2. **Packed Beds**: Studies in these systems are intended to clarify some aspects of hanging and gas distribution in blast furnaces. One aspect of the flooding work has now been completed, the results of which have led to the formulation of a new correlation for flooding which takes into account particle shape, wettability
and froth formation. The study of velocity profiles and pressure drop with melting has emphasized the importance of packing arrangement in packed beds of interest to extractive metallurgy.

3. **Properties of Low Alloy Steels**: The effects of composition and thermomechanical treatment on the structure and therefore the properties and potential commercial utilization of low alloy steels are being investigated by determining the influence of:

(i) deformation, before transformation, on the development of high strength in bainitic steels,

(ii) nitride particles on the high temperature cracking of austenite.

(iii) titanium and nitrogen additions on the resistance to grain coarsening at elevated temperatures of low alloy engineering steels.

4. **Structures in Plain Carbon Steel**: Metallographic and diffraction methods are being used to investigate the influence of variables such as heating and cooling rates on the structure and properties of transformation products in plain carbon steels. These studies have particular relevance to the understanding of the origin of the complex structures in the weld zone of welded steel, and thereby to the development of ways of controlling the structures and their properties.

5. **Martensitic Transformation**: The formation of martensite in ferrous and non-ferrous systems is being studied with particular emphasis on the effect, on the transformation, of the structure and properties of the initial phase.

6. **Fracture of Iron at Elevated Temperatures**: Electron fractographic techniques are being used to study intergranular fracture in iron strained at low strain rates at elevated temperatures. The technique allows direct measurement of the rate at which cavities are nucleated
at grain boundaries during creep. Controlled additions of carbon and oxygen are made to examine the effect of solute segregated at grain boundaries and of boundary oxide inclusions.

7. Creep of Zirconium: Creep and grain-boundary sliding are being investigated in Zirconium and its alloys over the temperature range 400°-600°C. The stress dependence and activation energies for creep are being determined and these measurements are supported by optical and electron metallography. It is hoped that this work will suggest operative creep mechanisms, and also explain why intergranular creep fracture does not occur readily in these materials.

8. Strain Hardening: Reported changes of strain hardening rate during straining of low-carbon steels have been analysed to identify the conditions necessary for such behaviour and to indicate its possible origins. A range of higher carbon steels has also been studied experimentally and the analysis is being extended to account for the behaviour of these materials.

9. Computer Aided Mechanical Testing: Mechanical testing procedures are being developed to take advantage of on-line computing facilities using a $\pm$ 200kN capacity Dartec electro-hydraulic servo testing machine and a Nova 1200 computer. The instruments and control system necessary to couple a hydraulic diaphragm bulging chamber to the servo testing system are also being developed and will provide a unique facility for making determinations of stress-strain relationships for sheet metals under biaxial stress and controlled strain rate.

10. Plastic Behaviour: Analyses of stress-strain relationships under conditions of uniaxial or biaxial stress and controlled strain rates are being undertaken to assess the influences of anisotropy and strain
hardening propensity on the plastic behaviour of sheet metals. Changes of strain hardening rate, during straining, are also being studied.

PUBLICATIONS

School of Civil, Mechanical and Mining Engineering


Department of Electrical Engineering


Papers presented at Conferences and Symposia


Department of Metallurgy


DIVISION OF LITERATURE AND LANGUAGE

Head of Division: Professor P.K. Elkin,
BA DipEd (Syd.)
BLitt DPhil (Oxon.)

ACADEMIC STAFF

Department of English

Professor
P.K. Elkin, BA DipEd (Syd.), BLitt DPhil (Oxon.)

Senior Lecturer
Doreen M.E. Gillam, MA (Lond.)

Lecturers
Dorothy L.M. Jones, MA (N.Z. and Adel.)
BLitt (Oxon.)
C.J. Nightingale, MA BLitt (Oxon.)

Senior Tutor
P.G. Abotomey, BA DipEd (W.Aust.)

Tutors
G.J. Hayes, BA DipEd (N'cle)
D.K. Host, BA (Syd.) (appointed February 1972)

Department of General Studies

Acting Head of Department and Lecturer
D.J. Dillon-Smith, MA DipEd (Syd.)
HIGHER DEGREE TOPICS

Department of English

Master of Arts

Attitudes to Nature in Modern Australian Fiction.
G.J. Hayes - enrolled 1971. Supervisors - Professor P.K. Elkin and Associate Professor J. Burrows.

The Prose Writings of George Orwell.
P.C. Geekie - enrolled 1972. Supervisors - Professor P.K. Elkin and Associate Professor R. Geering.

RESEARCH ACTIVITIES

Department of English

The major topics under investigation were: the theory and practice of satire from Dryden to Byron; twentieth-century satirical fiction; Medieval literature with particular attention to Old English poetry; Renaissance literature with special emphasis on poetry; attitudes to nature in modern Australian novels; the writings of Miles Franklin.

Department of General Studies

Research on aspects of the English language in the eighteenth century with particular reference to polite and vulgar usage is continuing. Also investigation on the possibilities of a language study in the Illawarra region, especially in connection with migrant population, is being carried out.
PUBLICATIONS

Department of English

Doreen M.E. Gillam. "Joyce's A Portrait of the Artist as a Young Man", Explicator, XXX;6 (1972), item 47
DIVISION OF PHYSICAL SCIENCE

Head of Division: Professor A. Keane,
MSc (Syd.), PhD (N.S.W.)

ACADEMIC STAFF

Department of Geology

Acting Head of Department and Associate Professor
A.C. Cook, PhD (Cantab.), AMAusIMM, FGS

Senior Lecturer
E.R. Phillips, PhD (Qld.)

Lecturers
R.A. Facer, PhD (Syd.)
A.J. Wright, PhD (Syd.)

Tutor
B.E. Chenhall, BSc (Syd.) (appointed March 1972)

Professional Officer
K.M.J. Wright, BSc (Syd.) (appointed April 1972)

Department of Mathematics

Professor
A. Keane, MSc (Syd.), PhD (N.S.W.)

Senior Lecturers
A.E. Chapman, MSc (Lond.)
D.J. Clarke, BSc (W.Aust.), MSc (Adel.), PhD (N.S.W.)
P. Suryanarayana, BSc (And.), MA (Madr.), PhD (Calif.)
K.P. Tognetti, BE MEngSc (N.S.W.), FACS, AMORSA

Lecturers
M.W. Bunder, BSc (N.S.W.), MA (N.E.), PhD (Amst.)
C.M. Gulati, MA (Delhi), MSc (New Mexico State)
PhD (Carnegie Mellon)
T.S. Horner, BSc DipEd (Syd.)
P. Pentony, PhD (A.N.U.) (appointed July 1972)
Tutors

P.T. Castle, BSc (N.S.W.)
F. Hille, DipPhysics T.U.(Braunschweig), DIC

Department of Physics

Acting Head of Department and Senior Lecturer

K.J. Ausburn, BSc (Syd.), MSc (Lond.), PhD (N.S.W.), DIC, MInstP

Senior Lecturer

J.N. Stephens, MA (Canab.), PhD (N.S.W.), AMInstF, AInstP, AAIP, IMEPS, CEng, FRAS

Lecturers

J.N. Mathur, MSc (Alig.), DrRerNat(Kiel), AAIP, IMEPS, MDPG
A.I. Segal, BSc (Melb.), GradAIP

Tutors

J.L.K. Lising, BSc (N.S.W.), GradAIP
N.L. Montgomery, BSc (N.S.W.)
G.K.G. Moore, BSc (N.S.W.), GradAIP
HIGHER DEGREE TOPICS

Department of Geology

Doctor of Philosophy

Statistical Studies in Sedimentation.

Master of Science

A Petrographic Study of the Stratigraphy of Australian Coal Seams.
Mrs. M. Smyth - enrolled 1969. Supervisors - Associate Professor A.C. Cook and Dr. G.H. Taylor.

A study of the Post-Permian Quartzites of Southern New South Wales.

Department of Mathematics

Doctor of Philosophy

A Correction to the Narrow Resonance Approximation for the Calculation of Resonance Absorption.

Applications of Collision Probabilities in Reactor Physics.

Numerical Methods Used in Neutronics Calculations.

Development of Languages for use in Conversing with a Digital Computer via a Remote Terminal.
N.W. Bennett - enrolled 1968. Supervisor - Professor A. Keane.

The Doppler Broadening of Resonance Profiles for Fuels in the Solid State.
D.J. McKeegan - enrolled 1968. Supervisor - Professor A. Keane.

Relativistic Nuclear and Particle Reaction Theory.

Eigenvalues of Matrices by Numerical Methods.
Commonwealth Postgraduate Research Award.

Oscillations of a Fluid on a Rotating Earth.
Topic and Supervisor changed 1972.

Edge Waves.
Commonwealth Postgraduate Research Award.

Master of Science

The Statistical Design of Discrete Computer Simulation Experiments.
N.M. Broers - enrolled 1969. Supervisor - Mr. K.P. Tognetti.

The Output of a Queue.

The Inverse Scattering Problem - A Numerical Calculation for \( \pi - n \) Interactions.
Forced Oscillations in Open Bays and Harbours.

On the Asymptotic Behaviour and Smoothness Properties of some Positive Linear Operators for the Approximation of Continuous Functions.

**Master of Arts**

Mathematical Models for the Wollongong Urban Area.
Miss J. Shaw - enrolled 1967. Supervisor - Professor A. Keane.

An Investigation of the J Function.

Application of Transfinite Numbers and Infinitesimals.
J. Korth - enrolled 1972. Supervisor Dr. M. Bunder.

**Master of Science (Operations Research)**
The following were enrolled as candidates for the Master of Science (Operations Research) degree: C. Brett, J.E. Casey, L.F. Halimah, J.M. Hogg, J.J. Jones, B.E. Murray, P.J. Reed.

**Department of Physics**

**Doctor of Philosophy**

Angular Distribution of Fission Fragments.
A.I.N.S.E. Research Scholarship.

**Master of Science**

Application of the Mossbauer Effect to the Study of Some Magnetic Properties of Ilmenite.
Infra-red Detectors.
The Performance of Infra-red Photographic Emulsions with
Particular Reference to Astronomical Applications.
A Survey of Infra-red Astronomical Objects.
Neutron Emission from Fission Fragments.
R.L. Walsh - enrolled 1970. Supervisors - Dr. J.N. Mathur and
Dr. J.L. Symonds.
Scattering of Lights by Solids.
Time Variations in Stellar Brightness.
A Tracking System for the Wollongong University College 18
inch Telescope.

STAFF RESEARCH ACTIVITIES

Department of Geology

1. Coal Carbonization: Correlations need to be more firmly
established between the maceral composition and rank of
coals and the strength of the cokes they produce when
carbonized. Two particular aspects are the production of
cokes from coals with high vitrinite content and the effect
of the vitrinite content of low rank coals in blends with
medium-rank coals. In part this is a collaborative project
with Australian Iron & Steel Coke Research and Geology
sections and the Joint Coal Board.
2. **Rank Variation in the Sydney Basin**: A three dimensional pattern of coal rank variation is being built up for the Sydney Basin. From this should develop ideas concerning the sedimentation, thermal and tectonic history of the Basin.

3. **Techniques in Stratigraphic Analysis**: Methods of ordering stratigraphic data for numerical analysis are being developed mainly in the fields of response surface analyses and time-series analysis. Particular attention is being paid to the problems associated with departures of the data structure from the ideal.

4. **Myrmekite**: Myrmekite is a quartz-plagioclase intergrowth found on the rims of some plagioclase crystals. Its significance at the margins and within potash feldspar megacrysts was studied.

5. **The Paragenesis of Gneissic Rocks from Broken Hill**: Preliminary petrographic studies of the mine sequence "granitic" gneisses from Broken Hill are being carried out.

6. **Magnetic Properties of Rocks**: Palaeomagnetic aspects and the relation of magnetic properties to the petrology and mineralogy of the rocks are being considered. In particular the usefulness of palaeomagnetism in the dating of rocks and continental drift is being investigated. The Illawarra region has offered scope for the application of rock magnetic studies to structural geology and mining geology.

7. **Study of Extrusive Rocks of the Illawarra Region**: With the planned commencement of an additional large-scale quarrying operation in the Illawarra Region an approach was made to the operators for permission to engage in long-term study of the physical and perhaps chemical...
characteristics of the igneous rock. It is intended that this study will supply information on the character of, and variation through, the rock.

8. **Geology and Photographic Recording:** Compilation of a photographic record of aspects of Geology as illustrated by features in the Illawarra Region is continuing. This is important in so far as many features are processes currently in active or formative stages, and might not otherwise be adequately recorded.

9. **Stratigraphy and Palaeontology:** One topic receiving attention is the Devonian stratigraphy and macrofossils of the Lachlan Geosyncline. Also the relationships between certain fossil faunas of New Zealand and Eastern Australia are being studied to assess the relationships of these two continents in the Early and Middle Palaeozoic.

10. **Retrograde Metamorphism at Broken Hill:** A number of areas of prograde and retrograde metamorphism have been recognized and the patterns of metamorphism are being revised to take account of retrograde effects.

**Department of Mathematics**

1. **Approximation Theory:** Some recent work in connection with uniform approximation of continuous functions on finite and infinite intervals using positive linear operator methods has been extended to several classes of functions. The smoothness of these approximations is being investigated. The asymptotic behaviour of these operators is also being studied. The results obtained so far have been encouraging and further work is in progress.
2. **Functional Analysis**: Work in the following areas is in progress:
   (i) Complete sequences in normed linear spaces and their stability.
   (ii) Non-linear evolution equations.
   (iii) Applications of "Numerical range" in Banach spaces.

3. **Group Theory**: Work in this area includes calculation of the laws of some relatively free nilpotent groups of low rank and study of the lattice of torsion free nilpotent varieties of groups.

4. **Set Theory and Logic**: A new system of predicate calculus without free variables was developed. A paper on this was published. Inconsistencies were found in certain systems of Combinatory Logic. This work is due to be published early in 1974.

   Investigations on a system of transfinite numbers as a basis for measure theory is progressing.

5. **Number Theory**: Work was done on a generalised Fibonacci series. New generalised Fibonacci functions were defined and investigated. Four papers on this work have been submitted for publication.

6. **Numerical Analysis**: Extensive research has been carried out on general methods for finding the eigenvalues of matrices, including complex matrices, using the LR and QR methods. Certain continuous boundary value problems have been examined and their solution has been reduced to the solution of the algebraic eigen-value problem.

   The most successful reduction has involved the use of a series in terms of Chebyshev polynomials to approximate the solution to the boundary value problem. "Rational" finite differences have also been used.
7. **Nuclear Reactor Theory:** Projects undertaken in this area have included equivalence relations for heterogeneous systems and a study of the effect of crystal binding on the Doppler broadened cross-section. Work on collision probabilities and numerical methods for use in reactor kinetic studies has been completed.

8. **Marine Physics:** Experimental investigations have continued to be hampered by the unavailability of relatively inexpensive recording equipment. Edge waves remained under study and an expedition to Rockhampton in May provided much valuable data. Surging of Port Kembla Harbour and the occurrence of long waves over the Continental Shelf continued to receive attention.

9. **Population Dynamics:** A common technique in the solution of differential delay equations has been to approximate the solution using Taylor series to dispense with the lag term. It has now been demonstrated that such methods are quite inadequate and that even if they were applicable a solution may be obtained on a computer at the same speed using direct numerical techniques.

10. **Operations Research:** The statistical design of computer simulation experiments with particular reference to the estimation of the mean of an autocorrelated time series is continuing. The analysis of the autocorrelated inter-departure distributions of a queue has been carried out. This is of considerable significance in the study of serial queues. Search theory is being applied to the detection of a submarine in an area by a barrier search.

Work is proceeding on the assessment and comparison of computer simulation languages. A project has been
completed which simulates an on line information system for production control.

11. **Simulation of the Port Kembla Harbour System:** A joint study with the Department of Geography is being carried out to build a computer model of the above system. Stage I of this system will simulate the inter berth sequences for typical general cargo ships. This will result in the collection of full statistics associated with the size of queues and occupancy times at each berth. Stage II incorporates cost data which will allow investigation of alternative operational and development policies for the system.

12. **Statistics:** The problem of allocating $n$ observations to $(k + 1)$ populations $(k > 1)$ is being considered. At present, the following two criteria are under investigation:

   (i) Allocating observations such that minimum Bayes risk is obtained;

   (ii) Allocating observations such that maximum information (measured in terms of uncertainty functions) is obtained. Sequential and non-sequential procedures are being considered. The results obtained will be compared with other methods previously suggested in the literature. Also, some algorithms are being sought for the quiz-show problem.

**Department of Physics**

Investigations of infra-red detectors for astronomical application continued. An 18-inch Newtonian infra-red stellar telescope has been brought into operation initially with infra-red photographic plates as the detectors. Mossbauer spectroscopic investigations of some magnetic minerals continued.
The fission fragment distribution, intrinsic structure effects in fissioning nuclei, intermediate structure, and isomeric fission were investigated in collaboration with the Physics Division, Australian Atomic Energy Commission, Lucas Heights.

**PUBLICATIONS** *

Department of Geology


* Wollongong University College Publications are listed on pages 66-67.


DIVISION OF SOCIAL SCIENCE

Head of Division: Professor R. Duncan,
MA (Adel.)

ACADEMIC STAFF

Department of Education

Acting Head of Department and Senior Lecturer
B.V. Hill, BA BEd (W.Aust.), MA (Syd.), MACE

Senior Lecturer
P.R. de Lacey, BSc (N.S.W.), MA (Auck.), PhD (N.E.),
MAPsS, MACE

Department of Geography

Acting Head of Department and Senior Lecturer
F. Beavington, BA PhD (Lond.), MSc (Aberd.),
CertEd (Cantab.), FRGS, FRSA

Senior Lecturer
R. Robinson, BA (N.E.), MA DipEd (N.S.W.), PhD
(Br.Col.)

Lecturers
E. Dayal, MA PhD (Delhi)
R. Young, MA (Syd.)

Tutor
Ann R.M. Johnson, BSc (Syd.) (commenced duty
February 1972)

Department of History

Professor
R. Duncan, MA (Adel.)

Associate Professor
C.P. Kiernan, MA (Cantab. and Melb.), PhD (N.S.W.)
(promoted January 1972)
Senior Lecturers
J.S. Hagan, BA DipEd (Syd.), PhD (A.N.U.)
A.M. Healy, BA (Syd.), PhD (A.N.U.)

Lecturer
H.N. Ingle, MA (Johns H.)

Tutor
Mrs. Josephine A. Castle, BA (Syd.)

Department of History and Philosophy of Science
Acting Head of Department and Lecturer
J.R. Panter, BA (Adel.) (appointed February 1972)

Department of Psychology
Acting Head of Department and Lecturer
N.L. Adams, BSc (N.S.W.), MAPsS

Senior Lecturer
J.L. Morris, BA BCom DipEd DipPsych (Melb.),
     EdD (Calif.), MAPsS, MACE

Lecturers
D.D. Diespecker, BA PhD (N'cle, N.S.W.), MAPsS
L.J. Taylor, BEd MEd PhD (Calg.)

Tutors
R.D. Christie, BA (A.N.U.) (deceased September 1972)
C.G. Cupit, BA (Syd.)
HIGHER DEGREE TOPICS

Department of Geography

Master of Science

Weathering Characteristics of slopes in the Wollongong area.

Miss A.R.M. Johnson - enrolled 1972. Supervisor - Dr. F. Beavington.

Department of History

Doctor of Philosophy

History of Australian Meat Industry Employees Union.


Master of Arts


Master of Arts (Pass) Degree

The following were enrolled as candidates for the Master of Arts (Pass) degree in 1972: J. Bates, C.H. Fisher, M.L. Hamilton, D. Jenkins, R. Johnson, F.X. Larkin.

Department of Psychology

Master of Arts

Motivational Correlates of Risk Taking.


STAFF RESEARCH ACTIVITIES

Department of Education

Research activities included:

1. Research into the philosophical dimensions of moral education.

2. Research into the cognitive characteristics of Aboriginal children and the problems of pre-school and compensatory education.
Department of Geography

Research activities included:

1. An investigation of soil and vegetation contamination by heavy metals industries in the Wollongong area.
2. The development of market gardening in England from Parliamentary Inclosure to the mid-twentieth century.
3. Fluvial and coastal geomorphology of the South Coast of New South Wales.
4. An investigation of slopes in the Wollongong area.
5. Markov chain analysis of shipping linkages in the port of Port Kembla; queuing analysis.
6. Factor analysis of socio-economic variables in the urban Illawarra; residential land prices.
7. Pressure of cattle population in India: a spatial analysis.

Department of History

1. Research continues on the influence and importance of science during the French Enlightenment. A comparative study of eighteenth-century French and British thought on science and religion is also being undertaken.
2. Further research was made into late nineteenth-century immigration into New South Wales from the United Kingdom.
3. A study entitled "What made Churchill tick" continues.
4. Various aspects of Australian Social History in the nineteenth and twentieth century, including trade unions, arbitration laws, education, the history of the labour movement and the status of women.
5. Research into colonial education policies in southeast Asia.
6. Research into intercultural problems in colonial areas, with particular emphasis on the history of native administration and industrial development in Papua New Guinea.
7. Research is being carried out into the role of the Russian Chancellor, Karl R. Nesselrode, and cosmopolitan doctrines of foreign relations in Russia's rapprochement with Britain in 1837 - 1846.

Department of History and Philosophy of Science

Research on British philosophy of science in the nineteenth century; in particular the influence of the scientific method of Sir Francis Bacon on that of Sir John Herschel.

Department of Psychology

1. The development of an apparatus to provide four channels of information to a vibrotactile unit and to a visual display panel. The displays are to be arranged in an instrument console which simulates an industrial control environment. The information is to be continuously variable.

2. An investigation into the vocational interest profile and personality characteristics of personnel employed in the automatic data processing industry.

3. The devising of expectancy tables for the guidance of high school students in New South Wales schools. Tables are being devised for Mathematics and English.


5. Data from country areas of Australia (especially N.S.W.) describing suicidal behaviours are being collected and analyzed. In particular, some of the characteristics of attempted suicide are being studied. One tentative aim is the comparison of data from N.S.W. communities with data from communities in Canada.

6. Characteristics of some criminal behaviours in the Illawarra have been collected and are being analyzed.
7. Data describing the incidence and possible correlates of marijuana usage (in the University and in some schools) are being collected and analyzed. Collaboration with researchers in the N.S.W. Department of Public Health, and with the University of Newcastle has been achieved.

8. Using a foreman's injury report form designed with research possibilities in mind, a comprehensive analysis of the physical factors associated with injury causing incidents has been undertaken at the Port Kembla plant of John Lysaght (Australia) Ltd. Examination of primary cause of injury, agent of injury, movement preceding the incident, place, time of day, shift and time since last break has already indicated a number of areas requiring more concentrated research. A second component of this research is comparing high accident repeaters with a matched sample of safe workers, the comparison exploring such variables as personality, visual competence, life history and work history. A third component of the research involves the detailed analysis of an observed sample of incidents which do not result in an injury.

9. A detailed comparison of job environment, work requirements and condition, and employee attitudes and personality characteristics is being made with respect to two classes of jobs, one with a high labour turnover and the other with a low. This work is directed towards making practical changes in the work situation, employee selection or training, or whatever other practically controllable variables emerge in order to reduce labour turnover.
10. Educational opportunities and disadvantages of deprived cultural groups. This research involves extensive field work in areas where there are concentrations of Aboriginals and/or white children living in culturally deprived circumstances, and the research is investigating the relationship between this kind of background and the children's intellectual development. An experimental approach, in terms of a specially programmed preschool education, is also being used.

11. Results from research into risk taking indicate amendments necessary to Atkinson's theory of achievement motivation when all terms are given precise operational definition and related firmly to empirical variables. A beginning has also been made towards developing an objective measure of the achievement motive.

12. A correlational study of data describing the first 100 vasectomy patients at the Sydney F.P.A.A. clinic was made (jointly with the Family Planning Association of Australia).

13. Data describing the bisensory presentation of coded visual and vibrotactile signals was collected from Berkeley High School students. This research was supported by an A.R.G.C. grant to Dr. D.D. Diespecker.

**PUBLICATIONS**

Department of Education


* Wollongong University College Publications are listed on pages 66-67.

B.V. Hill (ed.). A Charge to Keep. (Sydney, 1971).


B.V. Hill. Called to Teach. (Sydney, 1971).


Department of Geography


Department of History


Department of Psychology


HIGHER DEGREES AWARDED

Doctor of Philosophy

P. Van der Werf (Mechanical Engineering, 1966)
P.C. Arnold (Mechanical Engineering, 1968)
R.T. Wheway (Mechanical Engineering, 1968)
N.F. Kennon (Metallurgy, 1968)
C.P. Kiernan (History, 1969)
R.W. Upfold (Mechanical Engineering, 1969)
S. Marich (Metallurgy, 1970)
C. Chiarella (Mathematics, 1970)
K.J. McLean (Electrical Engineering, 1970)
F.M. Hall (Chemistry, 1970)
G.L. Jackson (Chemistry, 1970)
I.H. Reece (Chemistry, 1970)
B. Chauncy (Chemistry, 1970)
G.J. Hamilton (Chemistry, 1970)
Z. Herceg (Electrical Engineering, 1971)
J.W. Boldeman (Physics, 1971)
A.I.M. Ritchie (Physics, 1971)
D.J. Clarke (Mathematics, 1971)
D.J. Richardson (Mathematics, 1971)
B.E. Clancy (Mathematics, 1971)
K.A. Fleming (Chemistry, 1972)
R. Rudzats (Chemistry, 1972)
R.E. Summons (Chemistry, 1972)
J.L. Cook (Mathematics, 1972)

Master of Science

R. Rudzats (Chemistry, 1963)
T.W. Barnes (Metallurgy, 1966)
M.W. Dyos (Mathematics, 1966)
J.P. Pollard (Mathematics, 1967)
J.R. Snedden (Chemistry, 1968)
D.J. McKeegan (Mathematics, 1968)
K.J. Maher (Mathematics, 1968)
P.J. O'Halloran (Mathematics, 1968)
G.A. Segal (Physics, 1968)
A.J. Gilks (Mathematics, 1969)
A.R. Del Musgrove (Mathematics, 1969)
D.G. Thompson (Mathematics, 1969)
R.W. Wilcox (Mathematics, 1971)
H.J. Fraser (Physics, 1971)
J.B. Drinkwater (Metallurgy, 1971)
R.H. Edwards (Metallurgy, 1971)
K.J. McCarthy (Chemistry, 1971)
P.T. Castle (Mathematics, 1972)
N.D. Thomas (Mathematics, 1972)
P.C. Nancarrow (Chemistry, 1972)
R. Newell (Metallurgy, 1972)

Master of Engineering

P. Van der Werf (Mechanical Engineering, 1964)
M.J. Lowrey (Civil Engineering, 1968)

Master of Arts - Pass

Miss L. Buchan (English, 1972)
G.R. Colson (English, 1972)
J.A. Hughes (English, 1972)
W.R. Jennings (English, 1972)
W.J. Moon (English, 1972)
P. Stocker (English, 1972)
D. Thomas (English, 1972)

Master of Engineering Science

M.C. Burling (Electrical Engineering, 1968)
S.R. Webb (Mechanical Engineering, 1969)
E.F. Locke (Electrical Engineering, 1970)
K.B. Issa (Mechanical Engineering, 1970)
D.E. Roach (Mechanical Engineering, 1970)
D.C. Smith (Mechanical Engineering, 1971)
R.J. Graham (Mechanical Engineering, 1971)
R.J. Derrington (Mechanical Engineering, 1972)
J.T. Devine (Mechanical Engineering, 1972)
K. Forbes (Mechanical Engineering, 1972)
Department of Economics

B.R. Ross. Micro-Economic Aspects of Coal Production in New South Wales. Section 24, ANZAAS 44th Congress (Sydney, 1972), 1-12 + VI.

P.J. Wilson. The Relationship Between Unimproved and Improved Property Values as a Guide to Planning Urban Redevelopment. ANZAAS 44th Congress (Sydney, 1972), 1-17.


Department of Geology


Department of Mathematics


