the australian physicist

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A.I.N.S.E.
RESEARCH FELLOWSHIPS

ANNOUNCEMENT

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Research Fellowships are intended for scientists and engineers who have qualifications equivalent to the Degree of Ph.D. and are at a relatively early stage of an independent research career. Minimum tenure is two years, and the award may be extended for a third year. Emolument will be within the range of $6,200 per annum to $8,880 per annum, (Australian currency), and the Institute may contribute to the costs involved in travelling to and from Australia.

A research project within the field of nuclear science and engineering of interest to the Institute, must be proposed in the nomination after agreement between the candidate and the nominating organisation. Usually it is expected that a Research Fellow’s project will require some use of the specialised facilities located within the Australian Atomic Energy Commission Research Establishment at Lucas Heights, near Sydney, N.S.W.

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EMPLOYMENT SURVEY PROGRESS REPORT
Four types of questionnaires (for Universities, Colleges, employers and physicists) were distributed during December and January. Enough of these have now been returned to allow analysis to begin on a trial basis. However, the percentage of returns is still not satisfactory and AIP members are urged to help in any way they can to improve this situation.

Questionnaires have been returned from eleven Universities and almost twice this number of Colleges. Analysis has commenced but trends in the number of students graduating are not yet available.

Information has been received from about 130 employers but these are not fully representative of all types of employer. Insofar as trends can be discovered from this early sample it appears that employment opportunities for all physicists should continue to grow at a rate similar to that operating over the last four or five years. In some areas it is evident that employers feel unable to predict trends of future employment rates and so are playing safe by predicting replacement of existing staff only. However, some of the forecasts are comparatively optimistic, indicating somewhat greater growth rates than those of previous years.

An additional 80 questionnaires have been returned from private schools in all states. These indicate an average of just over one professionally qualified physicist employed per school and this number is rising at approximately ten per cent. per annum. Although questionnaires have been distributed to government schools in a number of states, no returns have yet been received from this area.

Approximately 1000 questionnaires have been returned in individual physicists with a broad distribution in location and types of employment. This probably includes a high percentage of returns by members of the AIP who were contacted first—and a much lower percentage from other physicists. Since there are probably close to 4000 physicists employed in Australia it is to be hoped that the number of forms returned will be at least doubled. Preparations have been made for computer analysis of these results and this can proceed when sufficient returns have been received. Eighty per cent. of those replying indicate willingness to participate further in an ‘attitude survey’ and distribution of these is now receiving attention.

THE CALENDAR

May 1972
9 NSW Branch Meeting, Physics Dept., Sydney Uni.
18–19 Report and Discussion on Employment Survey.
22–26 20th Council Meeting (AIP).

June
13 NSW Branch Meeting, Visit to ACI.

August
14–18 44th ANZSAAS Congress, Uni. of New South Wales.
21–25 Theme: "Achievements in Australia and New Zealand as a basis for the future”.

October
Second AINSE Neutron Diffraction Conference, Lucas Heights, NSW.

January, 1973

August
13–17 45th ANZSAAS Congress, Perth.

21–30 XV General Assembly of the International Astronomical Union, Sydney (IAU, AAS).

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HEWLETT PACKARD
MAGNETIC RECORDERS
AN INTRODUCTION TO COMPUTERS

From the Organizer

A Summer School on Reactor Physics, Mathematics and Computers was organized by staff of the AAEC Research Establishment for sixth form high school students; to give them some insight into the way mathematics and computers are used in scientific research. We aimed to give the students a broad view of the subject rather than a concentrated view of a few aspects (such as Fortran).

About 300 replies were received from students following distribution of application forms through the mathematics masters at metropolitan high schools. Of the 65 selected, 64 attended the school and 21 of these stayed at the Commission's hostel (Stevens Hall) for the duration of the school (17-21 January, 1972).

The school arose out of the success of a similar Summer School held last year and organized by the Royal Society of NSW with assistance from the AAEC and from IBM. Both schools emphasized application to a real (although somewhat in miniature) scientific problem with a digital computer being used to carry out the computation. Last year, supporting ideas came from pure mathematics (abstract spaces), whereas this year, physics supplied some light relief (demonstration of $E = mc^2$ from the energy of gamma rays emitted when positrons are annihilated).

The problem presented to the students concerned the question whether fuel in a nuclear reactor would start to melt following a severe disturbance to the steady running of the reactor. The fission process was introduced to the students—enough for them to grasp the idea that therein lay the source of power of the nuclear reactor. They were then given a first order nonlinear differential equation for the reactor power $P$, as a function of time $t$.

$$\frac{dP}{dt} = (P - 1 - b \exp(-t)) P, \quad P(0) = 1$$

following a disturbance $b$ to the steady state ($P(t) = 1$), which was stated as being based on an extremely simplified model of the actual process. We sought solution of the given equation so that we could calculate the maximum power surge $h(b) = \max F(t)$ for several values of $b$. An excessive disturbance such that $h(b) > 1.2$ would then result in the fuel starting to melt. The original question then became ‘is $h(0.5) > 1.2$ or not’?

The solution process followed two different attacks. One attack used applied mathematics, numerical analysis and computer programming whereas the second attack used a hybrid machine (analogue-digital computer).

The students, with lecture and tutorial help, followed the first attack themselves and were shown the second attack with the help of lectures on circuit theory for the hybrid machine.

From comments received, the students really enjoyed the school and most of them successfully solved the reactor fuel problem, although they did not fully comprehend all aspects of the work. (Had they done so we would have been a failure at introducing them to scientific problem solving—even in miniature!) Our enthusiasm for presenting science as an exciting servant of man was tempered by a down to earth talk on present career opportunities.—John Pollard, AAECRE

A Student's View

My appreciation of this course seemed to grow in the hours following its end, much like the reactor surge problem we were put to solve.

The final day was undoubtedly the climax, with the running of one's program successfully on the computers—the reward for one's concentration during the previous days. Much appreciated also, was being invited to actually touch and attempt to use most of the equipment shown—dispelling the often-gained impression that one is only being shown these things to be overawed. One has to be grateful for the amount of general stimulation; the obvious desire to answer questions, to help people in difficulties, and the variety of instalations shown.

Now the not-so-good: the lectures were definitely dry, for the most part; though one can appreciate the problem of the amount of fact to be transmitted with computer languages. Possibly lectures to smaller groups and some teaching aids would help. The sooner people use the computers the more they will be stimulated to learn and in fact, more time on the computers (in smaller groups) would be beneficial. On the other hand, the films, though a much needed change, were sometimes over-simplified.

Overall, however, the end of the school left a deep sense of regret (especially if one was lucky enough, as I was, to board on site) and this is a school I will recommend to anyone fortunate enough to be able to attend.—Jim Colbatch, Sydney Grammar School

GEOPHYSICS AND ASTROPHYSICS SUMMER SCHOOL

Introduction

The ACT Branch of the AIP, in co-operation with the Astronomical Society of Australia and the Australian Society of Exploration Geophysicists conducted a successful Summer School at the Australian National University from 24-28 January 1972. Two concurrent series of lectures were given by invited speakers dealing with topics in geophysics and astronomy. Over 150 delegates and speakers attended the School, approximately half of whom came from interstate.

The geophysics lecture series was sub-divided into two; one group of lectures designed to examine methods...
of interpreting geophysical data and the other to provide further understanding of the crustal tectonic theories brought about by recent worldwide geophysical and geochemical investigations. The astronomy lecture series was designed to bring together the latest ideas in optical and radio astronomy under the general theme 'recent developments in astronomy'.

Summary of Geophysics Lecture Series

The lecture programme is listed below.

Geophysical Interpretation

Prof. D. M. Boyd (University of Adelaide): (i) Interpretation of magnetic contour maps; (ii) Magnetic interpretation of individual anomalies; (iii) Further magnetic interpretation examples; (iv) Magnetic properties of rocks.

Dr W. I. Reilly (DSIR, New Zealand): (i) The nature of the earth's gravitational field; (ii) Mapping and enhancing features of the gravity field; (iii) Gravity modelling methods; (iv) Further gravity modelling techniques.

Dr R. F. Mercu (University of Western Ontario): Seismic refraction and reflection methods as applied to crustal scale investigations.

Dr A. S. Furumoto (Hawaii Institute of Geophysics): SH seismic wave interpretation and some engineering applications.

Mr J. C. Dooley (Bureau of Mineral Resources): (i) three-dimensional seismic refraction interpretation; (ii) The new maths and geophysics.

Dr S. L. Stephens (Esso Aust. Ltd.): Seismic reflection method.

Mr J. Burbury (Arthur, Burbury & Associates): (i) Mapping a prospect; (ii) The tie to geology.

Mr E. H. Franklin (Esso Aust. Ltd): Development of the Halibut field, Bass Strait.

Crustal Tectonics

Dr A. R. Crawford (ANU): (i) Old and new geology— with examples from the Indian sub-continent; (ii) Old and new geology—re-thinking the geology of Iran with lessons for Australia.

Dr D. H. Green (ANU): Geochemistry of the crust and upper mantle.

Dr T. J. Fitch (Lamont–Doherty Observatory and ANU): (i) Seismology and plate tectonics; (ii) Plate convergence, transient faults, and internal deformation adjacent to SE Asia and the western Pacific.

Dr B. J. J. Embleton (ANU): (i) Palaeomagnetism; (ii) Magnetic lineations.

It would be difficult to summarise all the ground covered by the lecturers but the following are some impressions of the series of lectures as a whole.

The wealth of gravity and aeromagnetic data now available in Australia, its continental margins and territories acquired through surveys of the Bureau of Mineral Resources, Geology and Geophysics, State Geological Surveys and exploration companies, provided the impetus for the two series of lectures on gravity and on magnetic interpretation. Dr Reilly covered the more fundamental ground associated with potential

field inversion methods with particular illustrations from gravity work in New Zealand. Prof. Boyd provided an excellent lecture series which emphasised the results which can be achieved by applying magnetic interpretation techniques to many different situations.

The diverse applications of seismic exploration methods were demonstrated in the lectures by Dr Mercu, Dr Furumoto, and Mr Dooley. Dr Mercu illustrated the methods and techniques of crustal scale seismic investigations with examples from his extensive experience in Canada. Some different approaches to three dimensional seismic investigation problems were covered by Mr Dooley. Dr Furumoto gave an excellent lecture on his engineering problems in Hawaii and the benefits to be gained by applying geophysical techniques. Mr Dooley in his second lecture exhorted geophysicists to take a more general view of the problems of mathematical representation of field data, based on the theory of approximation of functions.

The detailed geophysical work which goes into exploration and development of an oil prospect was emphasised by the lectures of Mr Burbury, Dr Stephens and Mr Franklin. These lecturers gave well illustrated examples of some of their successes in the Bass Strait and failures in Papua and New Guinea showing that the end product of a successful geophysical survey is not always an economic success.

The application of diverse geophysical techniques in the last fifteen years has produced new concepts in tectonic theory which were outlined by Dr Embleton and Dr Fitch in the second series of geophysical lectures. Dr Crawford gave two excellent lectures illustrating the impact of the new tectonics on geological problems with examples drawn from his extensive knowledge of Iran and the Indian sub-continent.

The contribution of geochemical investigations to the solution of current geodynamic problems was the subject of Dr Green's lecture. The experimental high pressure work of mineralogists is important in placing limits on models of the earth's crust and upper mantle and their dynamic processes. Some ideas on the evolution of the continents from possibly catastrophic beginnings were put forward as a result of moon exploration.

Finally Dr Fitch concluded the series with a lecture on the application of earthquake seismology to the solving of current tectonic problems in the SE Asian region. The benefits to be gained from improved networks of seismic recording stations were quite apparent.

Summary of Astronomy Lecture Series

The lecture programme is listed below.

Professor R. D. Brown (Monash University): Molecules in space.

Dr M. J. Disney (Mount Stromlo and Siding Spring Observatories): Introductory lecture—the Crab Nebula and its pulsar.

Dr D. J. Faulkner (MS and SSO): The late stages of stellar evolution.
Dr. K. C. Freeman (MS and SSO): The physics of stellar systems.

Dr. A. R. Hyland (MS and SSO): The spectrum between—irradiated observations.

Dr. M. I. Large (University of Sydney): The Molonglo radio-telescope.

Dr. D. J. McLean (CSIRO, Division of Radio-physics): Some topics relating to the solar corona.

Dr. D. B. Melrose (ANU): Theory of Pulsars.

Dr. B. A. Peterson (MS and SSO): QSOs, 'What are they?' and 'Where are they?'

Dr. B. J. Robinson (CSIRO, Division of Radio-physics): Interstellar molecules.

Dr. A. W. Rodgers (MS and SSO): Developments in astronomical instrumentation.

Dr. H. Wehner (Anglo-Australian Telescope Project Office): The Anglo-Australian telescope.

Attendance in the astronomy section came mainly from astrophysicists, graduate students and lecturers in physics. The central theme was recent developments in astronomy, with some emphasis on those studied more intensively in Australia. It was arranged in four groups, each of three lectures, on the solar corona, interstellar molecules, some recent instrumental developments, and finally, pulsars.

The introductory lecture was given by Dr. Disney who pointed out that because astronomy has to be observational rather than experimental, and because of the disparity between the human and cosmic time scales, elaborate theories have been constructed on quite slender foundations of fact. He gave numerous examples, showing how rapidly astronomy is expanding and how rich is the field of currently unsolved problems. Dr. Freeman spoke on the dynamics of elliptical galaxies and showed that, though they have presumably condensed out of disorganised clouds of gas, current theory can explain in a reasonable way why they are dynamically so similar, and why also this similarity should extend to globular star clusters. The similarities between quasi-stellar objects and N and Seyfert galaxies were discussed by Dr. Peterson, who also considered the very large redshifts of QSOs, their radio emission and the high density of their energy emission. Dr. Faulkner outlined the methods, theoretical and computational, for studying the structure and evolution of single stars, and considered in particular how their gravitational collapse can lead to the production of white dwarfs, supernovae, planetary nebulae and neutron stars.

Dr. Hyland described the rapidly developing field of infrared astronomy, and showed how some apparently normal stars are surrounded by clouds of cold circumstellar dust; how other infrared sources may be contracting clouds in the immediate pre-stellar stage; and how some galaxies radiate remarkably large amounts of energy in the infrared. This subject has close links with the recent exciting discoveries of polyatomic molecules in interstellar space. Professor Brown introduced this subject with a lucid thumbnail account of molecular spectroscopy, signal strengths, and the principles which guide the selection of molecules for search projects. Dr. Robinson then outlined the current position, describing methods of observation, emission mechanisms, abundance determinations, the inferences which can be drawn about physical conditions in molecular line sources, and some biological implications.

Dr. McLean gave a very clear account of the solar corona, information about which now comes not only from optical and radio observations, but also from X-rays and from direct observation of particle streams made above the earth's atmosphere. He showed a fascinating motion picture of the Sun at 80 MHz, made with the Culgoora spectrophotograph. He described the older work, and went on to show how more recently discovered phenomena, such as the various types of radio bursts, can be explained at least partially in terms of complex magnetic field structures and the motions of particles in these fields.

In the instrumental talks Mr. Wehner described the present status of the Anglo-Australian 150-inch telescope, Dr. Rodgers developments in instrumentation for large telescopes, particularly in the fields of computer control and many-channel phototelectric systems, and Dr. Large the 408 MHz Molonglo radio-telescope. The latter made a useful introduction to the final session, devoted to pulsars, and conducted at a high level. Dr. Large discussed their distribution, and the shape, width, polarization and dispersion of their pulses. After outlining the optical, radio and X-ray evidence of high energy emissions from the Crab Nebula, Dr. Disney dealt in depth with the rotating neutron star, a pulsar, which lies close to the centre. Dr. Melrose showed how the oblique rotation model could explain the 'clock mechanism' power requirements and slowing down of pulsars, and concluded by viewing the possible mechanisms for emission.

Summer School Organisation

The organisation of the School was in the hands of a committee comprising Mr. J. C. Dooley (Chairman), Mr. D. M. Finlayson (Secretary), Dr. J. R. Cleary representing Department of Geophysics and Geochemistry ANU, Dr. J. A. Brooks representing AIP, Professor S. C. B. Gascoigne, Dr. D. J. Faulkner, and Mr. H. J. Abraham representing ASA and Mr. F. W. Brown representing ASEG.

In addition to the formal lectures outlined above the programme included a reception on Monday evening, the AIP annual general meeting on Wednesday afternoon followed by a film evening, excursions to Mt Stromlo Observatory, the Molonglo Cross radio-telescope, BMR and ANU Department of Geophysics and Geochemistry on Thursday afternoon followed by the School dinner in the evening.

Lecture summaries were prepared by speakers prior to the School's commencement and these were available in a bound volume to all delegates—D. M. Finlayson, Bureau of Mineral Resources (Geology and Geophysics) and S. C. B. Gascoigne, Mt Stromlo and Siding Spring Observatory.

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ELECTRON MICROSCOPY IN AUSTRALIA

An Australian Conference on Electron Microscopy held in Canberra from 14 to 18 February this year was attended by about two hundred people. As is usual at these Conferences, about one third of the participants were physicists (plus metallurgists, solid-state chemists, etc.) and the other two thirds were biologists (plus botanists, entomologists, etc.).

There is no Society for Electron Microscopy in Australia, and following discussions some years ago a National Committee for Electron Microscopy was set up, under the control of the Australian Academy of Science, primarily for the purpose of arranging conferences and to communicate officially with the International Federation of Electron Microscope Societies. Conferences on electron microscopy have been held in Canberra at two-yearly intervals from 1968, this year’s being the third.

There is considerable controversy on the need for conferences on a technique such as this, and on what the scope of these meetings should be. This is particularly relevant at the moment because it is planned to hold the next full International Conference on Electron Microscopy (the 8th) at Canberra in mid-1974 and various aspects of the overall scheme of the program for that meeting were discussed at length. It was generally agreed that although papers on specialized applications would be considered, the main emphasis should be on new developments of the instruments and associated techniques, and on the theory of contrast in electron images. Several topics will be selected to form the basis of symposia.

This year’s conference contained nearly a hundred papers (14 of common interest, 26 physical, 58 biological). Not having attended the biological sessions I can make no comment on them, and their abstracts seem to be partly written in an unfamiliar language. Of the papers in the physical sessions about half reported new developments relating to instrument construction or to image interpretation and the others were concerned with applications to various fields—inorganic crystals, fibres, precipitates in metals, particles collected at high altitudes, surface structure of opaline silicas, and diatomaceous and slimy deposits on anti-fouling paints used on our navy’s ships.

As in the past the opening day consisted of plenary sessions restricted to special topics. There were two leading lectures and a symposium on scanning electron microscopy.

Recently electron microscopy has been successfully used to obtain ‘lattice images’ of crystals with large unit cells. These show the structure at unit cell level or better, and defects of various types appear as interruptions to a periodic array of lines (one dimensional images) or spots (two-dimensional images). The contrast in these images is optimum at slightly under-focus conditions, and the reliability of interpretation of such images was discussed by Mr Allpress. He presented examples and results of computation showing that a one-to-one correspondence between features in the image and the crystal existed, at least for some compounds under controlled conditions. In the other leading lecture Prof. Schofield described modern understanding of the structure of the critical components of the stomach (zymogen and parietal cells releasing peptic and HCl respectively, or oxyntic cells releasing both), and their mechanisms of action. He concluded with depressing micrographs showing damage done to the stomach walls (of rats) by ingestion of firstly excess whisky, and secondly aspirin.

Scanning electron microscopy and electron probe analysis have become established in Australia in the last few years, and consequently they were selected as topics for common discussion. Recently field emission sources of high electron brightness, high coherence, and small divergence have been developed and their use was described both in commercial scanning electron microscopes using back-scattered secondary electrons, and in the high-resolution transmission mode. Two unconventional scanning electron microscopes which have been constructed in Melbourne were described, together with the various modes in which they can be used. Unfortunately, as in other cases, the power strikes in Melbourne just before the conference prevented the achievement of anticipated last minute results.

Scanning microscopes have a great depth of focus, and consequently are ideal for examining very rough objects. In a single image, details can therefore overlap, and the interpretation can be clarified by using stereoscopic pairs of micrographs. Dr Filshie gave a magnificent display of micrographs taken in this way and projected (onto a metallised screen) so that two nearly coincident images were polarized at right angles and viewed by the audience through glasses fitted appropriately with polaroid lenses. In textile research scanning microscopy has been used to examine fibres being strained within the microscope, and to determine the mechanisms of wear of textiles, and to show how fibres are attacked by carpet beetles and moths.

Theoretically, ways of computing contrast from crystals and the understanding of phase contrast were discussed, and it was pointed out that, whereas in light optics the interpretation of slightly underfocussed images is not immediately clear, with electrons such images could be a representation of the projected charge distribution in the crystal, modified by an aperture function. It seems possible to obtain a faithful representation by subtracting contrast due to the aperture, and examples of contrast obtained in this way were shown.

Precipitation in metals leads to localized strain which produces contrast in the electron microscope; the interpretation of these images to give the nature of the Burgers vector of loops, the size of precipitate particles, etc., are not simple and several techniques for doing this were described. The ordered crystallographic shear structure developed in oxides of complex composition were described for WO3 containing potassium sodium, in W5Nb14O47, and in the Ti-Cr-O system; in all these papers information from lattice images and electron diffraction was combined to obtain models of the structure.—J. V. SANDERS, CSIRO Division of Tribophysics
NOTES AND NEWS

Conference on Physics and Engineering in Biology and Medicine

The Biophysics Groups of the Australian Institute of Physics and the Australian Regional Group of the Hospital Physicists Association will hold their twelfth annual conference in the Physics Department, University of Tasmania, Hobart, during the week 21–25 August, 1972. The Meeting will be supported also by the Federation for Medical and Biological Engineering. It is hoped that the meeting will be well supported, with a programme of interest to biophysicists, hospital physicists, bioengineers, biomatamathicians, and physiologists. Professor A. B. Hope, School of Biological Sciences, Flinders University of South Australia, has agreed to give the conference address on the topic ‘The Physics of Photosynthesis’. It is proposed tentatively that the scientific and business sessions be held on the first four days of the week. On Friday, 25 August, there will be a barbecue picnic at Port Arthur if there is sufficient interest. Some funds will be available to assist junior members of AIP who wish to attend the meeting and present a paper. Hobart’s weather in August usually has a fair proportion of sunny days with temperature maxima at about 56°F (13°C). The possibility of a cold spell cannot be ruled out, but the local committee will try to arrange that one does not occur during the conference! For further information contact Dr B. I. H. Scott, Physics Department, University of Tasmania, G.P.O. Box 252C, Hobart, 7001.

National Standards Laboratory—Open Days

On 30–31 May those interested will have an opportunity to see recent developments in the National Standards Laboratory and to discuss with its staff possible applications of the techniques and equipment used in the Laboratory. The National Standards Laboratory consists of the CSIRO Divisions of Physics and Applied Physics. In addition to maintaining standards of measurement and providing a calibration service for science and industry, the Laboratory undertakes pure and applied physical research. This includes work aimed at the development of improved standards of measurement and research of a more general character, including the study of problems of importance to industry. Admission tickets for afternoon or evening sessions can be obtained by writing to the Secretary, Open Days Committee, National Standards Laboratory, Chippendale, NSW, 2008, or by telephone 660 7614.

On Walkabout

Dr David Onley (Ohio University) is visiting Melbourne University Physics Department for six months, to work with the photonuclear group.

STOP PRESS

‘All Physics Ends in Mystery’

A large audience gathered to hear the seventh Pawsey Memorial Lecture—‘Photons and Stars’ delivered by Prof. R. Hanbury Brown in the Stephen Roberts Theatre, University of Sydney on 14 March 1972.

‘In the middle ages all the best people took up religion, now they take up theoretical physics.’ The philosophical content of Prof. Hanbury Brown’s address arose from the application of wave and particle concepts to interferometry. He commenced with the story of Galileo’s measurements of the apparent size of stars and ended with a description of new equipment proposed to extend the successful program of work which has been carried out with the intensity interferometer at Narrabri. ‘Will this proposal (costing $2.8M) be funded in Australia or Austria?’ (or USA) was the final challenge.

A stimulating and entertaining lecture; one of the most worth-while hours spent in a lecture hall—the comments were all in this vein.

It would seem that Dr Pawsey influenced Prof. Hanbury Brown in some measure towards setting up the Narrabri project and this adds to our debt to him. It was a great pleasure to have Mrs Pawsey as guest of honour as well as other dignitaries, professors and many more. Guests and members of the AIP attended a dinner after the lecture to complete the evening’s entertainment.

The Role of Nuclear Energy in Australia’s Development

A symposium on this topic is to be held at the Academy of Science Building in Canberra on June 1st and 2nd. It is under the sponsorship of the Academy of Science, the Society for Social Responsibility in Science (ACT) and the Australian Atomic Energy Commission.

The purpose of the symposium is to provide a forum for exchange of ideas among those with more than a layman’s concern for the major aspects of nuclear energy production in Australia. Topics to be covered include fuel and energy policies and economic considerations; technical prospects and problems; environmental hazards; legal and regulatory questions. It is hoped that discussion of these topics in the local context will lead to a consensus and perspective for the immediate future.

Attendance at the conference will be limited to those who have registered (fee $9), but registration is open to all interested persons. A copy of the program and a registration form may be obtained by writing to Mr J. Deeble, Executive Secretary, Australian Academy of Science, Box 216, Civic Square, Canberra, ACT 2608.
NINTH ANNUAL GENERAL MEETING

UNCONFIRMED MINUTES

Minutes of the 9th Annual General Meeting of the Australian Institute of Physics, held in the Physics Building, School of General Studies, Australian National University, Canberra, ACT, at 3.45 p.m. on Wednesday, 26 January, 1972.

1. Attendance.

1.1 Present

The President, Professor R. Street, was in the Chair and the following 16 other members were present: G. J. Atchison, A. R. Brown, J. G. Campbell, R. W. Crompton, J. R. de Laeter, J. C. Dooley, G. M. Gibson, R. Green, J. N. S. Jackson, C. Kerr Grant, J. K. Mackenzie, A. J. Mortlock, E. M. Richardson, B. D. Sowerby, L. Thomas, N. F. Uren.

1.2 Apologies and Proxies

Apologies were received from Dr F. J. Jacka and Dr R. D. B. Fraser. No proxy was appointed.

2. Eighth Annual General Meeting

2.1 Minutes

RESOLVED that the Minutes of the Eighth Annual General Meeting, held in the Department of Physics, University of New England, Armidale, NSW, on 11 February 1971, as published in 'The Australian Physicist', be taken as read and confirmed.

3. Ninth Annual Report

In moving the adoption of the Annual Report, the President referred to a number of points in it. He expressed particular pleasure at the appointment of Sir Mark Oliphant FAIP as Governor of South Australia. He referred to the decline in Company Subscribers, as a result of which Dr C. F. S. Malec and had been asked to undertake special responsibilities in this direction. Individual non-corporate membership had also declined, but corporate membership continued to increase.

Mr Brown asked a number of questions about the Survey on Training and Employment of Physicists, being organized by the NSW Branch. The Hon. Secretary undertook to pass the questions and comments on to the NSW Branch.

The President mentioned that following the visit in September 1971 of Dr L. Cohen, Secretary of The Institute of Physics (London), the President of the IOP, Dr J. W. Minter, was invited to visit Australia in February 1972 and had been invited to open the Victorian Summer School.

The Financial Statements were presented by the Hon. Treasurer, Dr J. K. Mackenzie. He explained that the accounts for 'The Australian Physicist' had been incorporated in the Consolidated Accounts for the first time. He pointed out that the Institute had begun to run into serious deficits, and that an increase of subscriptions appeared inevitable in the very near future. This was to be considered at the next Council Meeting. He commented particularly on the efficiency of the Institute's office, and said that owing to the excellence of its staff and the fact that it was shared with two other societies the AIP was getting very good value for the money spent on it.

A discussion followed regarding subscription increases. It was suggested that more frequent increases, perhaps at three-year intervals, would be preferable to larger increases less frequently. It was stated that an increased level of activities would require more money, but that perhaps this could be offset by increased membership.

RESOLVED that the 9th Annual Report and Financial Statements be adopted.

4. Appointment of Auditor

RESOLVED that Gordon Quinn and Company of 325 Collins Street, Melbourne, be appointed Auditors for 1972.

5. Amendment to Articles of Association

Notice had been given of a special resolution to amend Clause 9 of the Articles of Association. The Honorary Secretary, Dr J. G. Campbell, explained that no change in principle was involved, but that the changes were to bring the clause up to date with respect to degrees awarded by Colleges of Advanced Education and to physics degrees other than bachelor of science.

RESOLVED that Clause 9 of the Articles of Association be amended to read as follows:

"9. Every candidate for admission to the grade of graduate shall—

(a) have obtained the degree of bachelor with physics as a major subject at a university recognised for the purpose of this article by the Council or college of advanced education recognised by the Council or a diploma recognised by the Council as providing an equivalent training in physics from a technical college or similar institution recognised for the purpose of this article by the Council or shall have in the opinion of the Council attained an equivalent standard in his knowledge of physics and in his general education; and

(b) have had experience, for at least one year after obtaining that degree or attaining that standard, in the practice of physics or its applications or in the teaching of physics at such a standard as shall satisfy the Council."

That resolution was carried unanimously.

6. General Business

Dr Mortlock referred to a suggestion he had made previously (AP March 1970, p. 46) for the AIP to award medals for excellence in research and in other aspects of physics. Council had considered the suggestion but had not adopted it. He asked why this was so, and whether it could be reconsidered.

The President recalled that an argument against it had been that there were relatively few people in Australia who would qualify for such awards, and not enough new candidates would be coming forward. Dr Atchison said that the difficulty in making decisions as between achievements in different fields of physics may have also been an important consideration. In discussion, it was suggested that to test the latter point Council could go through the notional exercise of considering candidates without actually awarding any medal. Dr de Laeter suggested that one of the medals might be reserved for award to physicists aged under 35.

Dr Mortlock moved a motion that the Meeting recommend to Council that consideration be given again to the proposal to award one or two medals annually to physicists of note. Dr de Laeter seconded the motion, and it was carried unanimously.

The Meeting closed at 4.50 pm.
1. General

The pattern of steady growth which has characterized the Institute in recent years continued through 1971. Corporate membership increased by 6.0 per cent to 1351 and overall membership by 3.6 per cent to 1616. Company subscriptions however declined from 32 to 25.

Financially the Institute recorded a deficit of $2006. The Institute records with pleasure the appointment of one of its distinguished Fellows, Sir Mark Oliphant, as Governor of South Australia.

2. Finance

The accounts for the year ended 30 September 1971 differ from those of previous years in that the for 'The Australian Physicist' are included in the consolidated accounts. Members should have received separate financial statements from their Branches and Groups; the statements for the funds under the direct control of Council are presented herewith.

Income received by the central office from subscriptions and other sources was disbursed as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Branch and Group Activities</th>
<th>'The Australian Physicist'</th>
<th>Administration—office</th>
<th>Council Meetings</th>
<th>Transferred to Reserve Funds</th>
<th>Transferred to Accumulated Funds</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>28%</td>
<td>27%</td>
<td>8%</td>
<td>3%</td>
<td>4%</td>
<td></td>
<td>$19786</td>
</tr>
<tr>
<td>1971</td>
<td>31%</td>
<td>32%</td>
<td>12%</td>
<td>8%</td>
<td>5%</td>
<td>52</td>
<td></td>
</tr>
</tbody>
</table>

Since this is almost the entire income of the Institute it reflects the operations of the Institute as a whole.

The deficit of $2006 for the Institute as a whole includes a deficit for 'The Australian Physicist' of $71. With the reversion of Geophysics Group funds of $857, funds controlled by Council showed a surplus of $52 after transfer of $100 to a reserve fund for long service leave.

Subscription income was not greatly increased over that for the previous year, but administrative costs rose, both for 'The Australian Physicist' and in general. Council Meetings cost more than in 1970 when the attendance of Branch Chairmen at only one Council Meeting was financially supported.

The increase in Branch and Group expenditure was due in part to the allocation in 1970 of only 90 per cent. of a full year's grants to cover the adjustments of the financial year for Branches and Groups. Whilst sharing of the cost of the office with AIRAH and ISES keeps administrative costs down to a minimum, these costs nevertheless continued to rise, and overall income in 1971 barely covered expenditure.

In 1972 expenditure on administration, 'The Australian Physicist' and Council Meetings will increase, the cost of the Employment Survey will be contributed to by Council and all Branches, and it is not expected that increases will be covered by anticipated income. Therefore a deficit of $1500 has been budgeted for in Council-controlled funds.

Fixed investments remained at $15 000 and other funds were deposited at call in a permanent building Society. An investment of $2000 in Mutual Acceptance Ltd which matured during the year was re-invested at a higher interest rate. At its last meeting, Council considered that it should not be a policy of the Institute to build up large financial reserves, but that investments should remain fluid to allow Council and the Branches availability of funds to enable activities to continue and expand.

3. Membership

The Institute records with regret the deaths of Mr G. W. C. Hirst (Associate), Mr J. D. Jones (Graduate), Mr M. J. Oliphant (Graduate) and Mr C. A. van der Waal (subscriber).

The membership figures at the end of 1971 are given in Table I and the changes during the year are given in Table II. Recruitment of corporate members was greater than in 1970 but recruitment of Students and Subscribers was lower. The overall increase in membership (56) was similar to that in 1970 (57) but the number of non-corporate members continues to decline (−28).

It is to be regretted that the names of 19 corporate members and 28 non-corporate members had to be removed from the Register for non-payment of subscriptions.

During 1970 the Membership Committee dealt with 73 enquires regarding the assessment of overseas qualifications in physics and officers of the Institute collaborated with the Committee on Overseas Professional Qualifications, appointed by the Commonwealth Government, in the preparation of a booklet on the profession of physics in Australia.

In order to improve the Institute's liaison with its Company Subscribers, Dr C. F. S. Maliseet has been appointed an officer of the Institute with special responsibility in this area.

---

**TABLE I—REGISTER AS AT 31 DECEMBER 1971**

<table>
<thead>
<tr>
<th></th>
<th>ACT</th>
<th>NSW</th>
<th>Qld</th>
<th>SA</th>
<th>Tas</th>
<th>Vic</th>
<th>WA</th>
<th>OS*</th>
<th>UN†</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hon. Fellow</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Fellow</td>
<td>12</td>
<td>64</td>
<td>11</td>
<td>19</td>
<td>4</td>
<td>64</td>
<td>10</td>
<td>11</td>
<td>2</td>
<td>197</td>
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<tr>
<td>Associate</td>
<td>32</td>
<td>149</td>
<td>54</td>
<td>51</td>
<td>7</td>
<td>168</td>
<td>38</td>
<td>34</td>
<td>6</td>
<td>539</td>
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<tr>
<td>Graduate</td>
<td>46</td>
<td>173</td>
<td>35</td>
<td>82</td>
<td>8</td>
<td>154</td>
<td>43</td>
<td>60</td>
<td>9</td>
<td>610</td>
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<tr>
<td>Total Members</td>
<td>92</td>
<td>387</td>
<td>100</td>
<td>152</td>
<td>19</td>
<td>387</td>
<td>91</td>
<td>106</td>
<td>17</td>
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<tr>
<td>Student</td>
<td>6</td>
<td>57</td>
<td>13</td>
<td>17</td>
<td>3</td>
<td>41</td>
<td>19</td>
<td>5</td>
<td>11</td>
<td>172</td>
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<tr>
<td>Subscriber</td>
<td>9</td>
<td>26</td>
<td>2</td>
<td>14</td>
<td>1</td>
<td>23</td>
<td>6</td>
<td>3</td>
<td>9</td>
<td>95</td>
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<tr>
<td>GRAND TOTAL</td>
<td>107</td>
<td>470</td>
<td>115</td>
<td>183</td>
<td>23</td>
<td>451</td>
<td>116</td>
<td>114</td>
<td>37</td>
<td>1616</td>
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<table>
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<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th>Company Subscriber</th>
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</thead>
<tbody>
<tr>
<td>Company Subscriber</td>
<td>11</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>25</td>
<td></td>
</tr>
</tbody>
</table>

*Overseas
†Unattached

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TABLE II—CHANGES IN REGISTER DURING 1971

<table>
<thead>
<tr>
<th>Grade</th>
<th>Gains</th>
<th></th>
<th>Losses</th>
<th></th>
<th>Net Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New</td>
<td>Transferred</td>
<td></td>
<td>Deceased</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elections</td>
<td>To</td>
<td>From</td>
<td>Resigned</td>
<td>Removed from roll</td>
</tr>
<tr>
<td>Hon. Fellow</td>
<td>12</td>
<td>7</td>
<td>6</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Fellow</td>
<td>33</td>
<td>24</td>
<td>6</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Associate</td>
<td>54</td>
<td>26</td>
<td>24</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>Graduate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Members</td>
<td>99</td>
<td>57</td>
<td>30</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Student</td>
<td>41</td>
<td>26</td>
<td>1</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Subscriber</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>GRAND TOTAL</td>
<td>146</td>
<td>57</td>
<td>57</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>Company</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subscriber</td>
<td>2</td>
<td>8</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

4. Office
The staff complement remained unchanged during the year, the increased volume of work resulting from the admission of the International Solar Energy Society in 1970 having been absorbed.

5. 'The Australian Physicist'
During the year widespread economic difficulties were reflected in a loss of advertising revenue and increased publication costs for 'The Australian Physicist'. Although it was anticipated that administrative costs would continue to rise in the coming year, the 19th Council Meeting expressed its unanimous support for 'The Australian Physicist' as one of the most important activities of the Institute.

Following discussions earlier in the year, the Editorial Committee was reorganized and a number of Associate Editors appointed. An immediate benefit resulted with a number of new ideas emerging and several new projects being undertaken. Material for publication increased towards the end of the year and employment advertising improved slightly.

The Editor, the Assistant Editor and their assistants are to be congratulated on the work they have done over a long and difficult period and Council is confident that with the help of the reorganized Editorial Committee and the Associate Editors, 'The Australian Physicist' can become more viable.

6. Institute, Branch and Group Activity

6.1 Annual General Meeting
The Eighth General Meeting of the Institute was held at the University of New England, Armidale, New South Wales, on 11 February 1971. The President was in the Chair and 41 other members were present. The confirmed Minutes of this Meeting were published in 'The Australian Physicist' in April 1971.

6.2 Council and Executive Meetings
Two Council Meetings, each lasting two days, were held in May and October. The attendance of Group representatives at the October Council Meeting was again financially supported. Four Executive Meetings were held during the year.

6.3 Pawsey Memorial Lecture
The seventh Pawsey Memorial Lecture entitled 'From Radar to Radioastronomy' was delivered by Dr E. G. Bowen on 29 July in Perth. A large public attendance, including school students, was a notable feature.

6.4 Summer Schools and Conferences
The Summer School and Conference, organized by the NSW Branch, was held at the University of New England, Armidale, from 8 to 12 February, and covered three topics, 'Biophysics', 'Physics of Simple Liquids' and 'Nuclear and Particle Physics'. In addition to the sessions for these topics, two of general interest were held, as well as a reception, the conference dinner, an afternoon car trip and the Annual General Meeting of the Institute. The total attendance was 113, and the attendance of a number of students was supported by the Branches.

The Tasmanian Branch assisted in the organization of the 12th IUPAP Cosmic Rays Conference in Hobart in August. Of the 257 delegates who registered, 162 attended from 22 overseas countries, 56 from interstate and 39 from Tasmania, and the papers covered a wide range of cosmic ray and related topics. The published proceedings comprised six volumes and further papers await publication. Dr Harold R. Allan, Reader in Physics at Imperial College, University of London, participated widely in the programme and later visited other states as special AIP Lecturer.

Dr Allan also delivered the Einstein Lecture in Adelaide on 7 September. The Lecture, entitled 'Physics and Music' was attended by nearly 150 physicists, teachers and musicians.

6.5 Biophysics Group
The 11th Conference on Physics in Medicine and Biology was held at the Cancer Institute, Melbourne, from 19 to 21 August, immediately prior to the 9th International Conference on Medical and Biological Engineering. Forty delegates from Australia and overseas attended, 17 papers being presented. Whilst attendance at this Conference suffered as a result of its foreshortening to fit in with the International Meeting, this co-operation engendered the goodwill of the Society for Medical and Biological Engineering.

The 90th issue of the Australasian Bulletin of Medical Physics and Biophysics in August, with Mr K. H. Clarke as Editor since first publication in 1959, was a noteworthy achievement. With a membership of 92, the Group has maintained a close relationship with the Hospital Physicists' Association with whom it shares its activities and Office-bearers.

6.6 Geophysics Group
The Geophysics Group disbanded in May following a decision by its members that geographical isolation and diversity of interest prevented its effective operation.
6.7 Education Group.

Following the disbandment of the WA Section of the Group late in 1970, members of the SA Section concluded that the needs of education in SA could be served by the SA Branch and the Science Teachers' Association of SA, and took a similar step late in 1971. The NSW Section, however, remained active during the year and plans to continue and expand its activities with an exchange of ideas between professional scientists and science teachers.

6.8 Vacuum Physics Group

With the changeover of the Group Secretariat from NSW to SA, major activity was focussed around the organization of the 1972 National Symposium to be held in February 1972. Regular meetings were held in SA and Queensland.

Council has recognized a growing need to review the changing structure of Group membership and will devote part of its next meeting to discussion of these changes and how the Institute can best serve members of specialist groups.

6.9 Training and Employment of Physicists

The NSW Branch prepared questionnaires for circulation to teaching bodies, physicists and employers late in 1971, seeking current information on the training and employment of physicists in Australia. Reports from overseas countries on the employment situation for physicists, although not directly relevant to Australia, have been studied with interest and a continuing awareness by Council of its responsibility to members in this regard.

6.10 Benevolent Fund

Contributions of members to the Benevolent Fund are gratefully acknowledged; one payment was made during the year, and the fund stands at $2924.68.

6.11 Co-operation with Overseas Physicists' Organizations

In September Dr L. Cohen, Secretary of The Institute of Physics, visited Victoria, ACT and NSW and useful discussions were held with him by members of the Executive and Branch Committees. The opportunity was taken for an exchange of greetings between the Presidents of the two Institutes, renewing the strong bond which exists between The Institute of Physics and the Australian Institute of Physics.

6.12 Co-operation with other Scientific and Technological Organizations

The Institute was represented at the two meetings held by the Conference of Allied Societies during the year with representatives of the Australasian Institute of Mining and Metallurgy, the Institution of Engineers, Australia, and the Royal Australian Chemical Institute, during which matters of mutual interest and concern were discussed and action taken.

6.13 Emblem

At its Meeting in October, Council formally adopted a symbol prepared by Mr Terry Baker, graphic designer, as the official emblem of the Institute. This was described in the August issue of "The Australian Physicist".

6.14 Amendment of By-Law

At the 19th Council Meeting By-Law 4 was amended to provide for changes in membership grades of The Institute of Physics.

7. Membership of Council for 1971

The following members of the Executive took office in February 1971 and complete their term at the conclusion of the Tenth Annual General Meeting in 1973:

- President: Professor R. Street
- Vice-President: Dr F. J. Jacka
- Hon. Registrar: Dr R. D. B. Fraser
- Hon. Treasurer: Dr J. K. Mackenzie
- Hon. Secretary: Dr J. G. Campbell

- Mr A. F. A. Harper held office on Council, ex officio, as Immediate Past President.

- Each Branch was represented on Council by its Chairman, who held office until 31 December 1971 as follows:
  - Mr J. C. Dooley: ACT Branch
  - Professor C. D. Ellyett: NSW Branch
  - Dr O. J. Wordsworth: Qld Branch
  - Mr E. C. Johnson: SA Branch
  - Dr A. G. Benton: Tas. Branch (Acting)
  - Dr A. J. Dyer: Vic. Branch
  - Dr J. Graham: WA Branch

8. Officers of the Institute

- Secretary: Dr J. G. Campbell
- Assistant Secretary: Mrs J. A. Mackenzie
- Editorial Committee, 'The Australian Physicist':
  - Dr J. L. Symonds: Editor
  - Dr J. R. Bird: Deputy Editor
  - Dr W. H. Steel: Assistant Editor
  - Dr J. S. Dryden: Deputy Assistant Editor
  - Mr G. J. Bell: Book Review Editor
  - Mr E. G. Thwaites: Circulation Manager
  - Mr F. E. Codd: Editorial Assistant
  - Mr B. Deschry: Editorial Assistant
  - Dr G. R. Hogg: Secretary
- Associate Editors:
  - Professor B. Mainsbridge Dr T. M. Sabine
  - Dr A. H. Mortlock Professor F. D. Stacey
  - Dr R. L. Segall
- Auditor: Gordon Quinn & Co
- Trustees for the Institute:
  - Dr R. D. B. Fraser
  - Dr A. C. Hutley
  - Mr J. J. McNeill
  - Mr T. P. MacRae
  - Professor R. Street
- Trustees for the Benevolent Fund:
  - Dr J. K. Mackenzie: Chairman (ex officio)
  - Dr A. Walsh
  - Mr A. F. A. Harper
  - Dr J. G. Campbell
  - Mr F. J. Lehany
- Returning Officer: Professor B. M. Spicer
- Membership Committee:
  - Mr R. D. B. Fraser: Chairman (ex officio)
  - Mr K. H. Clarke
  - Dr J. L. Rouse
  - Professor R. Street (ex officio)
  - Dr J. K. Mackenzie (ex officio)
  - Dr J. G. Campbell (ex officio)
- Finance Advisory Committee: The Executive
- AIP Representatives on Joint Office Management Committee:
  - Dr J. G. Campbell (Chairman)
  - Dr J. K. Mackenzie
  - Dr R. D. B. Fraser

9. Branch and Group Committees for 1971

ACT Branch
- Chairman: Mr J. C. Dooley
- Vice-Chairman: Dr R. N. Crompton
- Hon. Secretary-Treasurer: Dr A. R. Brown
- Dr G. J. Atkinson, Mr D. C. Crayford, Mr K. C. Lang,
- Mrs B. R. Richardson

NSW Branch
- Chairman: Professor C. D. Ellyett
- Vice-Chairman: Dr J. C. MacFarlane
- Hon. Secretary: Mr T. M. Sabine
- Hon. Treasurer: Dr J. R. Bird
- Mr G. C. Fletcher, Professor N. H. Fletcher, Professor H. J. Goldsmith, Dr R. G. Hewitt, Mr K. R. Powell, Mr A. L. Segal, Mr E. G. Thwaites.

Qld Branch
- Chairman: Dr O. J. Wordsworth
- Vice-Chairman: Dr J. S. Mainstone
- Hon. Secretary-Treasurer: Dr P. E. Monro.
SA Branch
Chairman: Mr E. R. Johnson,
Vice-Chairman: Mr E. Hirsch,
Hon. Secretary: Mr W. S. Boundy,
Hon. Treasurer: Dr R. D. Campbell,
Professor H. A. Blevin, Professor B. H. Briggs, Mr C. V. Latz,
Dr A. F. Nicholson, Mr W. Walker.

Tas. Branch
Acting Chairman: Dr A. G. Fenton,
Hon. Secretary-Treasurer: Mr P. A. Hamilton.

Vic. Branch
Chairman: Dr A. J. Dyer,
Vice-Chairman: Professor H. C. Bolton,
Hon. Secretary: Mr J. V. Sullivan,
Hon. Treasurer: Dr J. L. Rouse,
Mr J. Bunting, Mr R. J. de Groot, Dr J. Jenkins, Dr C. F. S.
Malseed, Mr D. L. Swingler.

WA Branch
Chairman: Dr J. Graham,
Vice-Chairman: Dr J. B. Swan,
Hon. Secretary-Treasurer: Mr E. W. Thomas,
Mr R. F. Fleary, Mr B. King, Dr B. H. O’Connor, Mr R. E.
Price, Dr J. Robins, Dr K. W. Terry.

Biophysics Group
Chairman: Dr B. I. H. Scott,
Vice-Chairman: Mr K. H. Clarke,
Hon. Secretary-Treasurer: Mr K. H. Clarke,
(Joint) Mr P. F. J. Robotham,
Dr H. Coster, Mr R. J. de Groot, Professor M. E. Holman,
Professor D. G. Lampard, Mr B. W. Worthley.

Geophysics Group (to 20 May 1971)
Chairman: Dr A. J. Dyer,
Vice-Chairman: Dr J. A. Thomas,
Hon. Secretary-Treasurer: Mr P. D. Berwick,
Professor D. M. Boyd, Dr J. F. G. Darby, Professor R.
Green, Mr S. Gunson, Mr G. O’Mahony, Dr E. J. Polak,
Dr F. D. Stacey, Dr L. Thomas.

Education Group
Chairman: Mr A. W. Pybus,
Hon. Secretary-Treasurer: Mr C. V. Latz.

Vacuum Physics Group
Chairman: Mr J. Ward,
Vice-Chairman: Mr R. Walker,
Hon. Secretary: Mr R. H. S. Champion,
Hon. Treasurer: Mr F. C. Gillespie.

10. Council for 1972
Council for 1972 will comprise the Executive, elected to
take office at the Eighth Annual General Meeting, the Immedi-
ate Past President (Mr A. F. A. Harper) and the Branch
Chairman (see Section 11 below).
The Executive, which will hold office until the conclusion of
the Tenth Annual General Meeting in 1973, are as follows:

President: Professor R. Street
Vice-President: Dr F. J. Jacka
Hon. Registrar: Dr R. D. B. Fraser
Hon. Treasurer: Dr J. K. MacKenzie
Hon. Secretary: Dr J. G. Campbell

11. Chairmen, Hon. Secretaries and Hon. Treasurers
for 1972

ACT Branch
Chairman: Mr J. C. Dooley, Bureau of Mineral Resources,
PO Box 378, Canberra City, ACT 2601.
Hon. Secretary: Mr D. M. Finlayson, Bureau of Mineral
Resources, PO Box 378, Canberra City, ACT 2601.
Hon. Treasurer: Mrs E. M. Richardson, 35 Dickinson Street,
Watson, ACT 2602.

NSW Branch
Chairman: Professor C. D. Ellyett, Physics Department,
University of Newcastle, NSW 2308.
Hon. Secretary: Dr T. M. Sabine, AABC, Private Mail Bag,
Sutherland, NSW 2232.
Hon. Treasurer: Dr J. R. Bird, AABC, Private Mail Bag,
Sutherland, NSW 2232.

Qld Branch
Chairman: Dr O. J. Wordsworth, Department of Physics,
Queensland Institute of Technology, George Street,
Brisbane, Qld 4000.
Hon. Secretary: Mr K. L. Jones, Department of Physics,
University of Queensland, St Lucia, Qld 4067.
Hon. Treasurer: Dr P. E. Monro, Department of Physics,
University of Queensland, St Lucia, Qld 4067.

SA Branch
Chairman: Mr E. R. Johnson, 11 Park Lodge, 26 South
Terrace, Adelaide, SA 5000.
Hon. Secretary: Mr W. S. Boundy, School of Physics, SA
Institute of Technology, North Terrace, Adelaide SA
5000.
Hon. Treasurer: Dr R. D. Campbell, School of Physics,
SA Institute of Technology, North Terrace, Adelaide, SA
5000.

Tas. Branch
Chairman: Dr M. D. Waterworth, Department of Physics,
University of Tasmania, GPO Box 252C, Hobart, Tas.
7001.
Hon. Secretary-Treasurer: Dr P. M. McCulloch, Depart-
ment of Physics, University of Tasmania, GPO Box
252C, Hobart, Tas. 7001.

Vic. Branch
Chairman: Dr A. J. Dyer, CSIRO Division of Atmospheric
Physics, Station Street, Ascot Vale, Vic. 3032.
Hon. Secretary: Mr J. V. Sullivan, CSIRO Division of
Chemical Physics, PO Box 160, Clayton, Vic. 3168.
Hon. Treasurer: Dr J. L. Rouse, School of Physics, Univer-
sity of Melbourne, Parkville, Vic. 3052.

WA Branch
Chairman: Dr J. B. Swan, Department of Physics, Uni-
versity of Western Australia, Nedlands, WA 6009.
Hon. Secretary-Treasurer: Dr B. H. O’Connor, Department
of Physics, WA Institute of Technology, Hayman
Road, Bentley South, WA 6102.

Biophysics Group
Chairman: Dr B. I. H. Scott, Department of Physics,
University of Tasmania, GPO Box 252C, Hobart, Tas.
7001.
Hon. Secretary-Treasurer: Mr F. P. J. Robotham, Radiation
Protection Officer, Buildings Department, University of
Melbourne, Parkville, Vic. 3052.

Education Group
Chairman: Mr J. E. Shaw, National Standards Laboratory,
University Grounds, Chippendale, NSW 2008.
Hon. Secretary-Treasurer: Mr P. E. Ciddor, National
Standards Laboratory, University Grounds, Chippend-
ale, NSW 2008.

Vacuum Physics Group
Chairman: Mr J. Ward, 68 Peterswood Road, Elizabeth Park,
SA 5113.
Hon. Secretary: Mr J. McK. Nobbs, 8 Hazelwood Avenue,
Hazelwood, SA 5066.
Hon. Treasurer: Mr F. C. Gillespie, 6 Reginald Avenue,
Pindari, SA 5034.

12. Representation on Other Bodies
The Institute gratefully acknowledges the services of those
of its members who represented it on the councils or committees
of other bodies. The representatives for 1971 are listed below:

ANZAAS: Mr F. J. Lethany.
Australian Journal of Physics Advisory Committee: Dr J. P.
Wild.
Australian UNESCO Committee for Natural Sciences: Dr J. R.
Philip.

The Australian Physicist, April 1972
13. Annual Financial Statements

The Annual Financial Statements follow. For the year ended 30 September 1971 a deficit of $2006.32 was incurred including a deficit of $70.60 made by 'The Australian Physicist'. In the past the Institute has reported these two accounts separately and any comparison with previous years should take this into consideration. Income for 1971 included $857.38 representing funds passed over to Council on the closing down of the Geophysics Group. Expenses include $304.60 for symbol design. The NSW Branch has entered into contingent liabilities of $600 for its employment survey and $200 for its Radiation Damage Conference.

For the purposes of the Companies Act your Council reports that except as mentioned above the financial results have not been materially affected by items of abnormal character and no circumstances have arisen which render adherence to the existing method of valuation of assets or liabilities misleading or inappropriate. Since the period covered by our last report the only contingent liabilities entered into have been those undertaken by the NSW Branch as set out above. No contingent liability will fall due for payment during the next 12 months which will affect the ability of the Institute to pay its liabilities as they fall due. Your Council has felt it prudent to transfer $100 to Long Service Leave Reserves.

For and on behalf of the Council

R. Street
President
21 January 1972.

AUSTRALIAN INSTITUTE OF PHYSICS

FINANCIAL STATEMENTS

COUNCIL FUNDS

BALANCE SHEET AS AT 30 SEPTEMBER 1971

<table>
<thead>
<tr>
<th>1970</th>
<th>Current Assets</th>
<th>$</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Cash in hand or in Transit</td>
<td>160.63</td>
<td></td>
</tr>
<tr>
<td>2787</td>
<td>Balance in Bank:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>General A/C (Less outstanding cheques)</td>
<td>1331.26</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Western Pacific Permanent Bldg Society</td>
<td>2000.00</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Prepayments (October rent)</td>
<td>25.11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accounts receivable (IOF London)</td>
<td>136.50</td>
<td></td>
</tr>
<tr>
<td>14753</td>
<td>Investments at cost (see list in consolidated Institute accounts)</td>
<td>14752.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fixed Assets at cost, Less Depreciation:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1099</td>
<td>Furniture &amp; Fittings</td>
<td>1017.00</td>
<td></td>
</tr>
<tr>
<td>414</td>
<td>Plant</td>
<td>383.60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reserve funds (see table)</td>
<td>1400.00</td>
<td></td>
</tr>
<tr>
<td>19178</td>
<td>Operating Assets held by Council</td>
<td>21206.00</td>
<td></td>
</tr>
</tbody>
</table>

| 363  | Accounts payable: |
|      | Held for postage of AJP | 5.68 | 
|      | Salaries for September | 188.92 | 
|      | Audit fee | 165.00 | 
|      | Benevolent fund interest | 50.00 | 
| 388  | Subscriptions in advance | 191.58 | 
|      | Reserve funds (see table) | 11032.00 | 
| 10437| Branches and Groups | 1500.00 | 
|      | Council | 1500.00 | 
| 11188| Operating Liabilities of Council | 13163.18 | 
| 7990 | Excess of Assets over Liabilities | $8042.82 | 

AUSTRALIAN INSTITUTE OF PHYSICS

COUNCIL FUNDS

INCOME AND EXPENDITURE FOR THE YEAR ENDED 30 SEPTEMBER 1971

<table>
<thead>
<tr>
<th>1970</th>
<th>Income</th>
<th>$</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>15597</td>
<td>Members' subscriptions for 1971</td>
<td>15732.14</td>
<td></td>
</tr>
<tr>
<td>927</td>
<td>Members' subscriptions for 1970</td>
<td>807.02</td>
<td></td>
</tr>
</tbody>
</table>

| 418  | Entrance fees & Sundry income | 445.00 | 
| 1068 | Interest from Bank & Investments | 1542.19 | 
| 85   | Receipt duty recovered | — | 
| 140  | Share of clerical expenses (London) | 140.00 | 
|      | Exhibition & Summer School income | 263.10 | 
| 381  | Balance from Bump project | — | 
|      | Geophysics group funds | 391.38 | 
|      | Geophysics group reserves | 466.00 | 
| 18616| Expenditure | 19786.83 | 

<table>
<thead>
<tr>
<th>Expenditure</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative</td>
<td></td>
</tr>
<tr>
<td>2867</td>
<td>Salaries &amp; Wages</td>
</tr>
<tr>
<td>433</td>
<td>Rent &amp; Cleaning</td>
</tr>
<tr>
<td>731</td>
<td>Printing, Stationery and Insurance</td>
</tr>
<tr>
<td>349</td>
<td>Postage, Telephone and Cartage</td>
</tr>
<tr>
<td>118</td>
<td>Receipt duty paid</td>
</tr>
<tr>
<td>38</td>
<td>Sundries &amp; Bank charges</td>
</tr>
<tr>
<td>113</td>
<td>Distribution of AJP</td>
</tr>
<tr>
<td>150</td>
<td>Audit &amp; Accountancy</td>
</tr>
<tr>
<td></td>
<td>Design of Symbol</td>
</tr>
<tr>
<td></td>
<td>Legal expenses</td>
</tr>
<tr>
<td>597</td>
<td>Council Meetings</td>
</tr>
<tr>
<td>5000</td>
<td>'The Australian Physicist'</td>
</tr>
</tbody>
</table>

Branch & Group Activities

| 3584 | Branch Group grants (inc. transfers to reserves) | 3821.00 | 
| 432  | Special visiting Lecturers | 946.15 | 
| 1132 | Conferences & Lectures | 1327.95 | 
| 608  | Interest paid to Reserve & Benevolent Funds | 854.00 | 

The Australian Physicist, April 1972 61
### INVESTMENTS AT COST

<table>
<thead>
<tr>
<th></th>
<th>1970</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Balance at 1.10.70</td>
<td>$1934.41</td>
</tr>
<tr>
<td></td>
<td>Member contributions &amp; Interest less payments</td>
<td>$38.29</td>
</tr>
<tr>
<td></td>
<td>Bank Account</td>
<td>$406.33</td>
</tr>
<tr>
<td></td>
<td>Held in AIP General Account</td>
<td>$30.00</td>
</tr>
<tr>
<td></td>
<td>Investments at cost</td>
<td>$2488.35</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>$2924.68</td>
</tr>
</tbody>
</table>

### AUSTRALIAN INSTITUTE OF PHYSICS

#### RESERVE FUNDS 1 OCTOBER 1970 TO 30 SEPTEMBER 1971

<table>
<thead>
<tr>
<th></th>
<th>Balance at 1.10.70</th>
<th>Deduct Withdrawals</th>
<th>Add Underw Grants</th>
<th>Special Activities Profits</th>
<th>Annual Interest</th>
<th>Balance at 30.9.71</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Branches</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACT</td>
<td>$730</td>
<td>$500</td>
<td></td>
<td></td>
<td>$62</td>
<td>$792</td>
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<tr>
<td>NSW</td>
<td>$2272</td>
<td>$150</td>
<td></td>
<td></td>
<td>$170</td>
<td>$1942</td>
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<td>Qld</td>
<td>$508</td>
<td></td>
<td></td>
<td></td>
<td>$43</td>
<td>$401</td>
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<tr>
<td>SA</td>
<td>$818</td>
<td>$260</td>
<td></td>
<td></td>
<td>$70</td>
<td>$1374</td>
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<tr>
<td>Tas.</td>
<td>$400</td>
<td>$84</td>
<td></td>
<td></td>
<td>$34</td>
<td>$258</td>
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<tr>
<td>Vic.</td>
<td>$4140</td>
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<td></td>
<td></td>
<td>$322</td>
<td>$4492</td>
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<tr>
<td>WA</td>
<td>$742</td>
<td></td>
<td></td>
<td></td>
<td>$63</td>
<td>$805</td>
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<tr>
<td><strong>Groups</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biophysics</td>
<td>$18</td>
<td>$19</td>
<td></td>
<td></td>
<td>$1</td>
<td>—</td>
</tr>
<tr>
<td>Education</td>
<td>$234</td>
<td>$187</td>
<td></td>
<td></td>
<td>$20</td>
<td>$441</td>
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<tr>
<td>Geophysics</td>
<td>$466</td>
<td>$466</td>
<td></td>
<td></td>
<td>$9</td>
<td>$527</td>
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<tr>
<td>Vacuum Physics</td>
<td>$109</td>
<td>$100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$10347</td>
<td>$1495</td>
<td>$757</td>
<td>$509</td>
<td>$824</td>
<td>$11032</td>
</tr>
</tbody>
</table>

|                  |                    |                    |                   |                           |                |                      |
| **Council Funds**|                    |                    |                   |                           |                |                      |
| Subscriptions    | $400               |                    |                   |                           |                |                      |
| Stationery       | $1000              |                    |                   |                           |                |                      |
| Long Service leave | —                 | $100               |                   |                           |                | $1500                |

### 'THE AUSTRALIAN PHYSICIST'

#### INCOME AND EXPENDITURE STATEMENT FOR YEAR ENDED 30 SEPTEMBER 1971

<table>
<thead>
<tr>
<th></th>
<th>30.9.70 Income</th>
<th>30.9.70 Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grant from AIP</td>
<td>$590.00</td>
<td>$7801.46</td>
</tr>
<tr>
<td>Advertising</td>
<td>$2199.14</td>
<td>$1382.07</td>
</tr>
<tr>
<td>Sales and Subscriptions</td>
<td>$1461.11</td>
<td>$220.00</td>
</tr>
<tr>
<td>Bank Interest</td>
<td>$71.92</td>
<td>$28.14</td>
</tr>
<tr>
<td></td>
<td>$9192.66</td>
<td>$7843.04</td>
</tr>
<tr>
<td>Deficit</td>
<td>$9032.17</td>
<td>$121.11</td>
</tr>
</tbody>
</table>

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**AUSTRALIAN INSTITUTE OF PHYSICS**

**CONSOLIDATED INSTITUTE ACCOUNTS**

**BALANCE SHEET AS AT 30 SEPTEMBER 1971**

<table>
<thead>
<tr>
<th>Current Assets</th>
<th>$</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash in hand or at Bank</td>
<td>391.89</td>
<td>391.89</td>
</tr>
<tr>
<td>Council funds</td>
<td>124.00</td>
<td>124.00</td>
</tr>
<tr>
<td>ACT Branch</td>
<td>159.82</td>
<td>159.82</td>
</tr>
<tr>
<td>Tas. Branch</td>
<td>9.07</td>
<td>9.07</td>
</tr>
<tr>
<td>WA Branch</td>
<td>253.78</td>
<td>253.78</td>
</tr>
<tr>
<td>Biophysics Group</td>
<td>9.35</td>
<td>9.35</td>
</tr>
<tr>
<td>Education Group</td>
<td>88.45</td>
<td>88.45</td>
</tr>
<tr>
<td>Geophysics Group</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Vacuum Physics Group</td>
<td>128.77</td>
<td>128.77</td>
</tr>
<tr>
<td>SAR Arcs Project</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>SA Sen. School Phys. Course Fund</td>
<td>220.60</td>
<td>220.60</td>
</tr>
<tr>
<td>'The Australian Physicist' Prepayments</td>
<td>857.16</td>
<td>857.16</td>
</tr>
<tr>
<td>25 Council funds</td>
<td>25.11</td>
<td>25.11</td>
</tr>
<tr>
<td>180 Accounts receivable by Council funds</td>
<td>136.50</td>
<td>136.50</td>
</tr>
<tr>
<td>832 'The Australian Physicist' ACT Br. (Summer School)</td>
<td>12.00</td>
<td>12.00</td>
</tr>
<tr>
<td>852 Br. (Geophysics Conference)</td>
<td>500.00</td>
<td>500.00</td>
</tr>
<tr>
<td>Investments at cost (see table)</td>
<td>14752.50</td>
<td>14752.50</td>
</tr>
<tr>
<td>Fixed Assets</td>
<td>1400.00</td>
<td>1400.00</td>
</tr>
<tr>
<td>Plant, Furniture &amp; Fittings</td>
<td>1400.00</td>
<td>1400.00</td>
</tr>
<tr>
<td>Total Assets</td>
<td>16152.50</td>
<td>16152.50</td>
</tr>
</tbody>
</table>

**Current Liabilities**

| 388 Members Subs. | 191.58 |
| 25 'The Australian Physicist' | 70.60 |
| Unexpended Grants | — |
| 195 SAR Arcs Project | — |
| 221 SA SSFC Fund | 220.60 |
| Total Liabilities | 1781.35 |

**Accumulated Funds**

| 9470 Balance at 1.10.70 | 9470.04 |
| Add allowance for inclusion of AP | 1293.59 |
| 10763.63 |
| (2939) Surplus for 1970 | — |
| 2006.32 |
| Less deficit for 1971 | 100.00 |
| 8657.31 |
| Appropriation for reserves | — |
| 9470 Reserve Funds | — |
| 10473 Branches and Groups 11032.00 | — |
| 1400 Council | 1500.00 |
| 12532.00 |
| 11837 | — |
| Total | $21189.31 |

**INCOME AND EXPENDITURE FOR YEAR ENDED 30 SEPTEMBER 1971**

| 1970 (2939) Surplus | $2006.32 |
| Audit and Accountancy fees | 517.00 |
| Directors' fees | — |
| Depreciation of fixed assets | 113.00 |
| Interest on Reserve and Benevolent Funds | 854.00 |

**AUDITOR’S REPORT**

To the Members, Australian Institute of Physics

We report that in our opinion the accompanying Balance Sheet and Income and Expenditure Statement are properly drawn up in accordance with the provisions of the Companies Act 1961 so as to give a true and fair view of the state of the Institute's affairs as at 30 September 1971 and of the results for the year ended on that date. The accounting and other records (including registers) of the Institute examined by us are properly kept in accordance with the provisions of the Companies Act 1961.

Melbourne
20 January 1972

Signed: GORDON QUINN & CO.
Chartered Accountants

*The Australian Physicist, April 1972* 63
STATEMENT OF DIRECTORS

We, James Kenneth Mackenzie and James Gordon Campbell, being two of the directors of the AUSTRALIAN INSTITUTE OF PHYSICS, do hereby state that, in the opinion of the directors, the accompanying statement of income and expenditure is drawn up so as to give a true and fair view of the affairs of the Institute for the period ended 30 September 1971, and the accompanying balance sheet is drawn up so as to exhibit a true and fair view of the state of affairs of the Institute as at the end of that period.

For and on behalf of the Board
Signed: J. K. MACKENZIE
J. G. CAMPBELL

20 January 1972

DECLARATION BY THE SECRETARY

I, James Gordon Campbell, Secretary of the AUSTRALIAN INSTITUTE OF PHYSICS, do solemnly and sincerely declare that the accompanying balance sheet and statement of income and expenditure are, to the best of my knowledge and belief, correct, and I make this solemn declaration conscientiously believing the same to be true and by virtue of the provisions of an Act of Parliament of Victoria rendering persons making a false declaration punishable for wilful and corrupt perjury.

Declared at Melbourne in the State of Victoria this 20th day of January 1972.

Signed: J. G. CAMPBELL
Before me: F. W. ANSWERTH, JP

BOOK REVIEWS


Reviewed by S. C. Haydon, University of New England, Armidale, NSW.

In this latest edition of the well-established and successful Wiley series in Plasma Physics, Professor Nasser sets out to provide a suitable classroom text introducing the electrical engineer and physics student to the broad field of collision phenomena, radiation processes, microwave breakdown and plasma diagnostics, already dealt with elsewhere in the series. For a field so extensive and complex, the task undertaken is a particularly difficult one, especially when so much controversy has surrounded the interpretation of some of the basic phenomena. Much of this controversy was born out of qualitative and empirical reasoning and any modern introduction to the subject should provide the students with a proper perspective of the more precise, quantitative research of the past few decades.

In this respect the text seems to lag behind present knowledge in some areas. A discussion, for example, of some of the fundamental ionization parameters is often both inaccurate and misleading. New work from laboratories in both UK and Australia is notable for its persistent attempts to achieve a more precise and quantitative understanding of these basic processes and it is unfortunate that the text leaves the student with little appreciation of this collective effort and provides little guidance to the original work in the bibliography.

Despite these deficiencies there is a broad coverage of material and much useful information. The first five chapters cover fundamental concepts. Charge particle behaviour is dealt with in two chapters concerned with diffusion, mobility, drift and ionization phenomena. Both the Townsend and Streamer mechanisms are discussed at length. The student is provided with an excellent introduction to Corona discharges in which field the author had made many contributions himself. The glow discharge, but not the arc discharge is singled out for special consideration, the latter being mentioned only briefly in a short concluding chapter on plasmas. Problem questions but not answers are provided at the end of each chapter. The text is not without a number of errors and for the student seems highly priced.


This book contains the Proceedings of the Third International Symposium on Polarization Phenomena in Nuclear Physics, held at Madison, Wisconsin, in August 1970. The Symposium attracted from all over the world most of the prominent workers in this specialised field. Prior to the Symposium a number of the participants met and drafted the Madison Convention of symbols and terminology used to describe polarization phenomena. This convention is clearly set out in the front of the book.

About twenty review papers were presented on various aspects of polarization, both experimental and theoretical. The full texts of these papers and the discussion which followed them are given in the book. Almost two hundred contributed papers were presented and these are divided into categories such as two, three, four and five nucleons, light nuclei, elastic and inelastic scattering, isobaric analogue reactions and transfer reactions. There are also sections relating to polarized ion sources, neutron sources and polarimeters and polarized targets.

It is pleasing to note that considerable care has been taken by the editors and the printer to ensure that the complex mathematical formulae and symbols have been clearly presented and that the diagrams are of a very high standard.

Because of the very specialised nature of this book, its main interest will be to theoretical and experimental nuclear physicists involved in polarization work. It should serve as a very important reference book, at least until after the fourth symposium is held.
COMPUTER RESEARCH

Applications are invited for a position within the Computer Research Group at the Commission's Research Establishment. The duties of this group are to undertake research into mathematical and programming techniques, to keep abreast of the latest computing developments in the field of atomic energy and to assist Commission staff in the adoption of new or advanced techniques relating to computing. The Commission has a large IBM 360 model 50 computer system, and is currently establishing a computer network, based on this computer.

Applicants must have a Ph.D. (or postgraduate research experience of equivalent standard and duration) supported by satisfactory evidence of research ability. Salary, dependent upon qualifications and experience, will be within the following ranges—

Research Scientist $7484—$9494
Senior Research Scientist $9880—$11517

Application forms may be obtained by phoning the Recruitment Officer on 531-0111 or writing to the Director, A.A.E.C., Research Establishment, Private Mail Bag, Sutherland, N.S.W. 2232, not later than 2nd May, 1972. Please quote Position No. R102.

Australian Institute of Nuclear Science & Engineering

2ND AINSE NEUTRON DIFFRACTION CONFERENCE
LUCAS HEIGHTS, NEW SOUTH WALES
16-17th OCTOBER 1972

An informal conference reporting recent research and technical developments in the field of Neutron Diffraction, will be held in the AINSE theatre at Lucas Heights on Monday 16th and Tuesday 17th October 1972.

Program

It is planned to have review and research papers, presenting work in progress or recently completed on:—

(1) Chemical Crystallography; molecular & biological structures, inorganic chemistry.
(2) Diffraction Physics; extinction, Debye-Waller factors, bonding effects.
(3) Inelastic Scattering; phonons, magnons, molecular dynamics.
(4) Magnetic Structures; polarised neutrons, phase transitions.
(5) New experimental methods and industrial applications of neutron diffraction.
(6) Data Handling; statistics, computation and direct methods.

Nominations and offers of papers (relevant forms available from the conference secretary) will be accepted up to Monday, June 12th 1972.

All persons interested in Neutron Diffraction and wishing to participate may obtain full details of the conference from:—

Mr. D. A. Wheeler
Conference Secretary
A.I.N.S.E.
Private Mail Bag
Sutherland, N.S.W. 2232
The Model 860 is a compact, self contained, easy-to-use system for direct measurement of heat flow. It consists of a Micro Foil® heat flow sensor mated with a sensitive battery-operated microvoltmeter, calibrated to read Btu/ft² h directly.

244 HIGH VOLTAGE SUPPLY FOR PHOTO-MULTIPLIER TUBES TO -2200 VOLTS.

Features
- stability 50 ppm per hour.
- noise less than 500 microvolts.
- overload protection with automatic recovery.
- -200 to -2200 volts.

The new Model 244 High Voltage Supply is a highly stable, low noise, power supply optimized for powering photomultiplier tubes. It is also ideal for ion chambers and solid state radiation detectors as well as being useful for capacitor and semiconductor leakage measurements.

For more information or inclusion on the Keithley mailing list contact:

WF2-18012

Who's set up and printed by Simmons Limited, 32 Parramatta Road, Glebe, Sydney, N.S.W.