The Australian Physicist

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ADVERTISING
All enquiries concerning advertisements to the Advertising Manager: J. T. O'Mara, PO Box 39, Bondi Junction, NSW 2022; Telephone: (02)389-9698.

Advertising matter will be accepted only on the understanding it does not contain material in contravention of the Trade Practices Act, 1974.

Advertising Deadline – 1st of month of issue.

COPY
Manuscripts (original plus one copy) should deal with topics of interest to physicists in Australia, such as developments in the teaching or practice of physics and reports on lectures, conferences, Australian facilities, Institute Affairs, etc. They should be double-space typed on one side of the paper only, with margins 40 mm wide, and should follow the style used in this journal. The recommended length is up to 4 pages for articles (as printed with figures), up to 500 words for letters, and up to 250 words for Notes and News.

Deadline – 1st of month prior to month of issue.

Figures – High contrast originals, 80 mm wide (or if essential, 168 mm wide) and minimum necessary height are required for printing. Larger originals can be used but authors are asked to pay for preparation costs with the purchase of reprints.

References – are to be cited in the text thus:
Brossel, J. (1947) or Brown [1971].

They should be arranged alphabetically at the end of the article and be presented thus:

Standards – Concise Oxford Dictionary; Metric Units (SI), Symbols, Units and Nomenclature in Physics, IUPAP Document UP II (SUN 65-3) 1965; World List of Scientific Periodicals.

Copies – Two kinds of copies of items published are available to authors:
Extracts – the relevant pages as they are printed in the journal;
Reprints – printed separately, with any extra requirements by authors such as covers, special headings, etc.

Notice of AGM
Notice is hereby given that the 13th Annual General Meeting of the Australia Institute of Physics will be held at 8 p.m. on Monday 9th February, 1976, in the Laby Lecture Theatre, School of Physics, University of Melbourne.

AGENDA
1. Apologies and declaration of proxies
2. Minutes of the 12th AGM
3. Business arising from Minutes
4. 12th Annual Report and Financial Statements
5. Appointment of Auditor
6. Other business

Note:
(a) The date of the AGM has been chosen to be during the ANSNE Conference when physicists from all parts of Australia are expected to be in Melbourne.
(b) It is intended to arrange an informal buffet dinner before the Annual General Meeting.

John R. Pilbrow, Hon. Secretary.

Second National Congress
The Second National Congress of the Australian Institute of Physics will be held at the University of N.S.W. during the period 23-27th August, 1976.

Members are reminded that the tear-off portion of the first circular was to have been returned by 1st December, 1975.

Any enquiries should be directed to Congress Secretary (Dr B. Window), School of Physics, University of Sydney, NSW, 2006.

Vacuum Physics Conference
The executive of the Vacuum Physics Group has recently been transferred to Brisbane so that they can organize the Fifth Australian Vacuum Conference and Vacuum Technology Course which is to be held on 12-16 July 1976. The secretary of the organizing committee is Mr T. G. Lewis, Physics Department, QIT, Box 246 North Quay, Brisbane 4000.

Registration forms and a Provisional Programme are included in this issue of The Australian Physicist.

LATE NEWS
The AGM will be preceded by an informal buffet meal at 6.30 p.m. at University House, University of Melbourne. Would members who expect to attend the meal please let us know by contacting: The Assistant Secretary, AIP PO Box 52, PARKVILLE Vic. 3052. Tel. (03) 347 4941 by 5 February 1976.

The Editor and the AIP assume no responsibility for the information and opinions which are published.
EDITORIAL & PRODUCTION TRANSFER

As from January 1, 1976 the editorial and production functions of *The Australian Physicist* transfer to Adelaide. The new editor is Mr. W. S. Boundy, former chairman of the S.A. Branch and organiser of the First National A.I.P. Conference. As Bill Boundy was in the U.K. on study leave until late 1975, Dr. Ted Sandercock undertook the task of preparing this issue.

The previous editor, Dr. Roger Bird, and his editorial committee prepared most of the material ready for production and the new editorial officers publicly acknowledge the valuable assistance and cooperation given by the N.S.W. Editorial Committee. During the handover period the N.S.W. Editorial Committee will continue to assist the new S.A. committee. The new S.A. committee will be listed in the February issue. Until the new committee meets and discusses future policy, the present editorial policy will continue.

It is appropriate that an appreciation of Dr. Roger Bird's contribution to physics in Australia through his editorship of *The Australian Physicist* be published in this issue. The new editorial committee thanks Dr. J. R. Symonds for writing such an appreciation. On behalf of the members of the A.I.P. thank you Roger Bird for your interest, enthusiasm and contribution to physics in Australia.

DR. BIRD RETIRES AS EDITOR

In the twelve years of the life of *The Australian Physicist*, it has had only two editors. It seems appropriate that the first should write of the work of the second as he retires because together they have known and experienced the uncompromising pressures placed on the editor of a monthly journal.

Soon after Dr. J. R. Bird had agreed to be assistant editor from January 1972, it was with relief that I recognised the interest, initiative and drive which he could bring to the position of Editor. Council agreed to his appointment as Editor in May 1972. Roger set about collecting together an active and enthusiastic Editorial Committee to assist him in running the journal operations and maintaining a high standard for the journal in spite of ever-increasing costs and fluctuating income. He has battled to retain control over costs and I am amazed that he succeeded in holding the rising cost of the journal to members below the general level of inflation in the community at large.

His innovations have brought feature topics to the attention of members while at the same time attracting the interest of advertisers, a vital issue in cost control. In looking back over the last three volumes, I observed that Dr. Bird has broadened editorial comment to the point where, judging from the variety of responses, members are wishing to put their point of view in letters and through articles. Alan Harper commented of the AP in an earlier note on editors, that "...It must be one of the two tangible returns many members see for their subscription—the other being their subscription renewal notice!" Roger Bird has obviously succeeded in ensuring that the AP remains as the strong link in the chain of communication between the physicists. We all offer him our grateful thanks for the innovative effort and good organisation which he has shown as Editor.

Dr. John Symonds

Dr J. R. Bird, editor
*The Australian Physicist*
May 1972 – December 1975
President’s Column

This issue of The Australian Physicist marks a new stage in its history. After eleven years in Sydney, the editorial and production functions of this journal have now moved to Adelaide.

Each of the previous editors, John Symonds and Roger Bird, together with their enthusiastic editorial committees, have done a great job in establishing the journal and bringing it to its present high standard. I am sure that the new Editor, Bill Boundy, will enjoy equal success in maintaining it and developing it still further. Bill accepted the post of Editor while still overseas, and most of the task of preparing this particular issue has been done by the Assistant Editor, Ted Sanders.

This move is significant not just for the journal but for the Institute itself. If we are to be truly national in our organisation then we should be able to move our vital functions around the country from time to time, and not necessarily just back and forth along the Sydney-Melbourne axis. In fact the membership of the South Australian Branch now is probably not much different from that of the New South Wales Branch when The Australian Physicist was inaugurated in 1964.

Institute Affairs

THE REGISTER

CHANGES IN MEMBERSHIP FROM 15 OCTOBER 1975 TO 25 NOVEMBER 1975

FELLOWSHIP

New Elections
D. R. Hutton (Vic) T. R. Ophel (ACT)
P. J. Jennings (WA) K. N. R. Taylor (NSW)

MEMBERSHIP

New Elections
I. R. Atman (SA) R. W. Clay (SA)
J. A. Bennett (Vic) A. R. Ward (NSW)
F. W. Brown (ACT) R. C. Warren (SA)

Transfers
R. W. Lincolne (Tas)

Resignations
G. A. Hawkes (Vic) B. M. Seppelt (NSW)
A. J. McCormack (Tas) L. W. Williams (ACT)
L. R. Mitchell (WA)

The secretariat of the Institute itself was also situated in Sydney at its outset in 1962. That moved to Melbourne five years later, and then in 1968 the appointment of paid staff became necessary and the office in Clunies Ross House was established. After a decade in Melbourne, an opportunity for the secretariat to move again will occur at the beginning of 1977, when the current term of office of the members of the Executive expires. The Council will need to consider this question at its meeting in May, when nominations for the next Executive are to be considered.

On this question of office-bearers, the Council is required under our Articles of Association to make nominations, and in every case so far the Council’s nominees have then been elected unopposed. There has not yet been a contested election in the Institute’s history. I wonder if that is a good thing. Elections are somewhat expensive, but on the other hand if our Institute is alive and meaningful to its members then I would expect some diversity of viewpoints which could lead to alternative nominations. A contested election would in turn arouse members’ interest further in the affairs of the Institute. A call for further nominations occurs when Council’s nominations are announced after the May meeting. Let’s see what happens this year.

James Campbell

GRADUATESHIP

New Elections
P. B. Cripps (NSW) A. J. Parr (Qld)

Transfers
G. L. Millar (SA) P. T. Allan (SA)
H. K. Cowan (WA) M. D. Dillon (NSW)
W. J. Frost (Qld) J. W. Holford (Qld)
P. L. Stephenson (Vic) R. C. Warner (Vic)

Resignations
B. F. Dixon (Vic) D. D. Richardson (ACT)
A. V. W. Wroe (Tas)

Removed under Article 13
J. M. W. Rynn (ACT)

REGISTER AS AT 25 NOVEMBER 1975

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2 The Australian Physicist, January 1976
Take a rope ladder with rigid rungs. What will happen when you twist the bottom rung? Ninety-nine students out of a hundred, when faced with this question, are unable to provide any sensible answer. It is a very difficult question but it does not involve any advanced ideas. There is no quantum mechanics in this problem — just statics. Physicists find this problem difficult because they are not able to see intuitively — in other words, guess how a system will behave if they do not know beforehand.

It takes some foreknowledge (having climbed rope ladders when one was young) or a feat of imagination to realize that this is a hysteresis problem. The torque increases until the bottom rung reaches $270^\circ$ when the ladder flips and the torque drops to zero (figure 1). On the way back it would stay at zero until $180^\circ$ is reached and then the ladder again flips and the torque required to hold it rises sharply.

The ability to penetrate to the heart of a problem without having to solve it mathematically and the ability to guess almost correctly what is going to happen is an extremely valuable talent to have, not only in physics but also in other aspects of life.

**Thinking Intuitively**

We cannot teach intuition but must show students that it is possible to develop an intuitive faculty. This faculty of guessing correctly does not involve a set of rules but the constant comparison of known solutions to problems, with arguments which might have given the same answer in a more elementary and more direct way.

Consider the potential well problem. Schrödinger's equation gives a solution which is sinusoidal in the central region and exponential near the sides. With suitable boundary conditions we can obtain the ground state wave function. Instead of stopping there, we ought to say "Well, why does it look like that?" We should look back at the analysis as a guideline to the sort of thing that will happen under those conditions. We should then be able to make an intelligent guess as to what will happen in similar problems — for example a V-shaped well.

Those who know this problem will immediately say "Airy Functions". Heaven forbid that we should bring up students to be able to do this at the right moment. How many of us, in a course on wave mechanics, discuss the use of graphical methods to make a reasonable guess at what the ground state wave function of a V-shaped well should be. I have found that about $20\%$ of students can attempt this as an examination question.

In developing an intuitive approach, the idea is to start by solving problems which are soluble exactly and then go on to discuss how to seek an approximate solution to these and more difficult problems. A student should realize that when an experienced physicist says that something is physically obvious, his mental process should not be seen as a total mystery but as an extrapolation of known solutions. This is the art of guessing correctly. It should be seen as respectable and not merely as a way of avoiding anything which is too complicated.

**Teaching Intuition**

If students regard qualitative as empirical and weak with quantitative as precise and strong, then they have been taught to miss the wood for the trees. We are teaching them that no answer is better than a qualitative answer — one which is essentially correct, physically, but which will need a lot of refining and hard work before it can be exact. In many cases quantitative can mean pedantic.

There are many ways to teach qualitative methods so that they are enjoyed by students. In a seminar, pose a problem and then ask the students to discuss it. Usually one or two will rush in, perhaps overboldly, and then be shouted down by some of the others. With a bit of luck an animated discussion ensues — possibly involving a physical problem which is, in itself, quite difficult. Instead of being discouraged by complicated mathematics, they can be encouraged to talk out the answer until they are all satisfied that they know what will happen.

Take a pair of electrodes of some unusual shape (figure 2). What would the field lines be like and what is the shape of the equipotential halfway between them? Working individually, students will produce answers which show a marked similarity but, in detail, may
differ quite widely. They can then start quarrelling about who has the right answer. A measurement with electrodes painted on a graphite sheet will settle the question. Then go on to discuss whether there is a clear criterion by which you can judge whether an answer is acceptable or not.

Figure 2. Hypothetical Electrode Shape

Another problem which often arouses excited enthusiasm is illustrated in figure 3. A simple pendulum, about four feet long and with a weight at the end, has two strings spaced sufficiently to ensure that it swings in a plane. A vane is attached at a certain height above the weight and immersed to a variable depth in a pot of molasses or treacle— to provide variable damping depending on the depth of immersion in the molasses. Having studied the concept of complex frequency, with the damping as the imaginary part, what is the trajectory of \( \omega \) in the complex plane? How does it change if we alter the damping?

Figure 3. Damped Pendulum

The class is usually wholly at a loss to see what argument to apply when asked whether the curve will approach the frequency axis vertically or at an angle. It is almost pathetically gratifying to see the way some of their eyes light up at the thought that they can use a set of words that they have usually met before in many topics concerned with fundamental particles. I leave it to you to decide what is the very simple fundamental concept of electricity which lets us know that the curve will come down vertically.

Examining Intuition

Examinations are not really methods of assessment of students. They are potent propaganda weapons for telling students what we expect them to learn. Reproducing book work, tests assimilating power but does terrible harm to their attitude towards a subject. On the other hand, we can include short questions, year after year, which cause them to teach themselves the art of intuitive thought. It is not difficult to invent 5 questions a year of this sort. There are potential problems and diffraction problems ad nauseam. Take a screen which has been set up for a powder diffraction experiment and in the screen cut a hole which is the shape of any letter of the alphabet. What would the diffraction pattern be like?
Conference Report

ICPE EDINBURGH 1975

The International Conference on Physics Education which was held at Edinburgh on 29 July – 6 August, 1975 was quite a large conference, with 350 delegates from 84 countries. It is hard for an individual to form an overall view of the work of such a conference, so what follows is essentially a very selective summary. A common view does not really exist, because the problems of the developing countries are quite different from those of the developed countries. One group has to teach increasing numbers of students a science which is often alien to the people’s cultural traditions; the other is trying to sustain a subject apparently in decline from its recent position of strength.

The main work of the conference was done in working groups, each of which had a previously prepared review article or ‘trend paper’ before it. The working groups moved, in some nine hours of discussion, to final reports which will be published as a book in the UNESCO Trends series, to be published in 1976. There were also plenary sessions, some addressed by distinguished speakers and some devoted to discussing progress reports produced by the working groups. Talks by the distinguished speakers are to be published in Physics Education.

There were also exhibitions of books, course materials produced by educational institutions, and of commercial apparatus. A range of movie films was also shown, some of which were quite outstanding, for example “Powers of Ten” (Charles and Ray Eames, Eames Studio) and “Coupled Oscillators” (Alan Holden, Bell Labs, Ealing Film Loops). Both of these are suitable for students at about first year tertiary level.

A dominant theme of the distinguished speakers, particularly Professor Bondi, was that physics is an essentially human activity, often involving collaboration across political frontiers. Physics was also seen as often progressing by serendipity rather than by cold, hard logic or “scientific method”. The scientific paper and other scientific writing often distorts the human activity involved in the process of discovery by giving a false picture of a smooth, logical, inevitable path to progress.

People at large were seen as perceiving physics solely as a collection of sterile “facts”, and one should counter this by emphasising where possible the open-ended and human aspects of the subject.

The working group on ‘The process of course and curriculum development and evaluation’ will include among its recommendations one emphasizing the value of continuously modifying a curriculum, even a little at a time. In the case of school curricula, teachers themselves should be involved in this, which should help morale. The ‘Hawthorne effect’ (a positive response to any educational innovation) is seen as important for both students and teachers. It is clear that a course based on units or modules lends itself well to continuous modification, and avoids the trauma involved in replacing a ‘lock-stock-and-barrel’ course like PSSC. The problem remains of ensuring that students see the unity of physics.

The working group on ‘Women in physics’ noted the success that Harvard Project Physics has had in encouraging girls at secondary school level. Harvard Project Physics incorporates the social implications of physics and includes examples from situations which are meaningful for girls. In one scheme quoted in which Project Physics is used, girls constitute 35-40% of the enrolment.

Another dominant theme of the conference was the need for good teachers. Important factors were seen to be good professional status, self-regard and morale taken together with opportunities to participate in decision-making regarding all aspects of their work.

How to evaluate new curricula proved to be a difficult topic. Because methods of evaluation are likely to be unreliable and subjective, it seems best to use as many different methods as possible of evaluating pilot schemes, before using a new course on a wide scale. Methods suggested include feedback from students and comments from disinterested colleagues. The danger was recognized of producing school curricula leading only to the universities and the professions.

The ‘Science and society’ working group came to the interesting conclusion that university physics departments have three major roles:
(i) to carry out fundamental research,
(ii) to communicate knowledge to others, i.e. to teach,
(iii) to teach and do research in the area of “physics and society”.

The first two are traditional aims, but the third is relatively new. Its presence indicates a general trend apparent in the thinking of the conference members.

The group concerned with “New approaches to teaching and learning in universities” spent a lot of time discussing personalized systems of instruction i.e. various forms of the Keller plan. Proponents of the traditional lecturing methods came to recognize that, at the very least, the Keller system brings to light the deficiencies of some lecture courses in which interdependent sequences of new concepts are addressed at more or less incomprehending and anonymous heads in a lecture theatre.

The consensus was that the Keller system is well worth a try for concept-rich courses involving up to fifty students. However, such projects will almost certainly fail unless they are carefully planned (including the use of small pilot schemes) and unless one’s colleagues are told what one is doing (see ‘The Rise and Fall of PSI in Physics at MIT’, by C. Friedman et al., unpublished; copies from Professor E. F. Taylor, Room 208-136, MIT, Cambridge, MA 02139).

The conference was far from being a meeting simply of pedagogues. The proceedings were strongly influenced by the views of distinguished professional physicists either present at the conference for its own sake or going on to specialist conferences at Helsinki, Munich or Amsterdam.

D. Coates.

The Australian Physicist, January 1976
I have been asked by the committee of the Institute of Physics in New Zealand to prepare a brief report on activity in this country. To do justice to everyone engaged in various aspects of research, teaching and service would require a lengthy and frustrating inquiry; the time required would indicate that I had nothing better to do. Consequently this report is going to be quite superficial, but hopefully it will indicate that physics is alive and well in this part of the world.

The Institute of Physics in New Zealand is perhaps a somewhat unusual organization. It acts as the professional body for physicists in NZ and, as its name suggests, is a branch of the Institute of Physics (London). It has also been designated a cognate society by the Australian Institute of Physics and members can enjoy some of the benefits of membership of groups of the Australian Society. It is also a Member Body of the Royal Society of New Zealand, and acts as its sectional committee for physics.

Although research is also carried out in a number of Government departments, institutes and laboratories, it is easiest to illustrate the interests of New Zealand physicists by reference to what is going on in the universities. All universities in NZ (there are six of them) offer degrees in physics, a four-year Honours degree and a three-year Ordinary degree. It is not just a chauvinism that exists in the small country which makes university physicists proclaim, as I have often heard them do, that our graduates are good graduates. Ten or twelve years ago they proceeded to the great overseas centres of physics to do their post-graduate work; nowadays the post-graduate scholarship scheme keeps them at home and this has helped to build up healthy research interests in all centres.

Auckland for example has an active low-energy nuclear physics group making a name for itself with its 'up-and-down' tandem and developing and operating a polarized ion source which produces 14 MeV polarized neutrons. They are also involved in the field of biophysics, investigating for example, by laser scattering, the change in diffusion coefficient resulting from the transcription of RNA by various particles.

The Victorian University of Wellington also operates a low-energy nuclear facility. There is active research on the electrical and optical properties of amorphous and liquid semiconductors and metal alloys. Cross-fertilization of these two interests has lead to studies of hydrogen, deuterium and tritium diffusion in solids following ion implantation.

Canterbury is also actively engaged in the field of solid-state, working on experimental and theoretical studies of crystal structure using a wide variety of spectroscopic and other techniques. Experimental and theoretical studies in atmospheric physics are directed to high altitude investigation of circulation, gravity waves and turbulence. They also operate an observational astronomy programme based on the Mt John Observatory; instruments include a 61 cm telescope installed this year.

Otago's work in atomic physics centres on the nature of the interaction of atoms and radiation, studying optical fluorescence and using pulsed optical excitation, pulsed magnetic and electric fields. Another flourishing activity is in space physics where interest centres on the propagation of electromagnetic disturbances in the magnetosphere between Dunedin and its conjugate magnetic point in Alaska. A proposed series of controlled experiments should add a new dimension to the understanding of magnetospheric plasma.

Waikato University works in the fields of plasma, quantum optics and biophysics.

Massey University works in the fields of biophysics and radio transmission.

The above catalogue is by no means exhaustive and I am conscious that many will feel cross that they have not been mentioned. Further research at universities, Government departments and institutes extend into optics, atmosphere, radio astronomy, wind energy, solar energy, geophysics, oceanography, nuclear radiation and many other fields both experimental and theoretical. One may wonder at the wisdom of spreading the research activity so widely in a country the size of New Zealand. However it is difficult to confine narrowly the interests of intelligent people and their natural resourcefulness will find a way of getting into a problem they think exciting. Fortunately the DSIR and the UGC have given a reasonable level of financial support which, together with a high degree of adaptability and do-it-yourself attitude, has produced a flourishing research climate in the country.

In this the Institute of Physics in New Zealand is playing an increasingly important role. At the annual general meeting held in Dunedin on 28 November, 1975, there was an attendance of nineteen. The following were elected to the major offices:

Professor R. E. White, F Inst P, Auckland University (Chairman),
Dr G. F. Stuart, M Inst P, Physics & Engineering Laboratory, Lower Hutt (Vice Chairman),
Professor A. R. Poletti, F Inst P, Auckland University (Secretary/Treasurer), and
Dr J. A. Campbell, Canterbury University (Correspondent).

-- J. N. DODD, F Inst P
NOTES AND NEWS

PEOPLE AND INSTITUTIONS
Secretary of ASTEC
Mr. H. C. Crozier, an Assistant Secretary of CSIRO, has been seconded to the Interim Australian Science and Technology Council as Secretary.

ANZAAS — New Chairman
At the Hobart Congress next May, Mr J. B. Davenport will become Chairman of ANZAAS. Mr Davenport has been active in ANZAAS since 1966, especially in the NSW Branch, and is the Honorary Editor of Search. At present he is on secondment from the Division of Food Research, CSIRO, to the Reserve Bank, as Science Liaison Officer administering the Rural Credits Development Fund. (Search, November 1975).

The Institute of Physics — Officers and Council
The following elections to Council took place in October 1975:
Vice-President: Professor O. S. Heavens; Hon. Treasurer: Dr H. Rose; Hon. Secretary: Dr R. Press; Members of Council: Dr L. E. Lawley, Dr W. M. Lomer, Professor J. E. Thompson.

Awards in Advanced Education
Bulletin No 7 of the Australian Council on Awards in Advanced Education includes additions to the list of nationally registered courses and awards. Previously recognised awards are listed in earlier issues of the Bulletin. The following courses related to physics are mentioned:
Computer Science: B App Sc — Swinburne CT, Victoria.
Teacher Education (Sec): Grad Dip — Kuring-gai CAE, N.S.W.
Teacher Education (Sec. Science): Dip Teach — Kuring-gai CAE, N.S.W.

Term dates 1976 — correction
The dates for NSW Government Schools, shown in the list in the December issue, should be amended as follows:

CONFERENCES

Nuclear Technology
The 11th Nuclear Technology Course for graduates in physical science and engineering will be held on 3 May — 20 August 1976 at the AAECRE, Lucas Heights. Enquiries and applications should be sent to The Principal, Australian School of Nuclear Technology, Private Mail Bag, Sutherland, NSW 2232. The closing date for applications is 15 March 1976.

Third International Conference on Liquid Metals
To be held from 12 — 16 July 1976 at the University of Bristol, Bristol, UK. This conference follows those at Brookhaven in 1966 and Tokyo in 1972. It is intended to direct attention to areas of present and future interest, and include some emphasis on the links between physics and chemistry of liquid metals.
The closing date for registration will be 11 June 1976.

Optical Group Conference
The Optical Group of The Institute of Physics is arranging a conference at the University of York from 21—23 September 1976.

Thermal, Acoustic and Viscoelastic Properties of Polymers
The Polymer Physics Group of The Institute of Physics is arranging a conference at the University of Strathclyde from 17-18 September 1976. Contributions are invited in the area of theoretical and experimental and acoustic studies and related topics on polymeric materials.

Oceanographic Instrumentation
Dr. D. R. Lockwood (CSIRO Division of Fisheries and Oceanography) will speak at a meeting of the Institute for Instrumentation and Control, Clunies Ross House, Melbourne, at 6 p.m. on Tuesday 24 February 1976.

Radiation Protection
The First Annual Conference of the Australian Radiation Protection Society will be held in Sydney on 10—12 May 1976. Offers of papers should be sent to Mr J. C. E. Button, AAECRE, Private Mail Bag, Sutherland, NSW 2232. For further information contact Dr R. Rosen, Radiation Protection Officer, UNSW, PO Box 1, Kensington, NSW 2033.

WHAT PEOPLE ARE SAYING

Social Impact of Technology
“For many people, social change is the result of technological change . . . This theory of 'technological determinism' ignores the complexity of the relations between technology and society, and the unpredictable results of technological change. If we are to control the situation, and prevent technology and economic growth from causing environmental disasters, more sophisticated concepts are necessary. This paper outlines concepts such as 'socio-technical' and 'socio-ecological' systems, and the development of 'social impact statements' as a necessary complement to environmental impact statements.” — S. Encei, J.Inst.Eng.Aust., Sept.-Oct. 1975.

The Australian Physicist, January 1976
Physicists in Medicine

"It is possible for a physicist to work in medicine as a painter may work upon the Forth railway bridge – plying his own trade, performing a function necessary to the railways but never becoming a railwayman, never more deeply involved in the operation ... The typical physicist is not for long engaged in medicine before he seeks a role which will give him deep and satisfying involvement. He may arrive with pen and brush but he ends up trying to drive a train or run the railway." – J. McKie, Physics Bulletin, October 1975.

Peer-Review System

"Peer-Review is by far the best means we have for deciding how funding should be distributed in a given research area ... This system has deep roots in the structure and procedures of the scientific community and is the principal procedure used for quality control ... In an age in which the issues of society cannot avoid being ever more closely involved with science and technology we are going to need more peer-review, not less." – H. L. Davis, Physics Today, September 1975.

Solving Other People's Problems

"... many universities, as well as teaching and giving degrees, offer to solve other people's problems ... Not every client shows the perception of the boilers farmer who sought the help of the local university in controlling environmental conditions in his chicken houses, where little birds were dying of cold in the winter and heat stroke in the summer. Members of the academic think-tank applied themselves to his problem and produced a bulky report entitled Heat Loss in Broiler Chickens. The farmer ... read the first line and, realizing that he had wasted his money, threw the bulky volume into the wastebasket. The report began ... 'Consider a spherical chicken ...'. – J.M.A. Lenihan, Physics Bulletin, November 1975.

Energy and Physics

"... where the scientific priorities lie for physicists in these coming years affronting the problem of energy conversion, storage, distribution and conservation ... Haecke left at the top of his list, by virtue of its importance, the problem of storage and this was followed by transport, the liquefaction of coal in situ (in order to produce transportable gas), the physics of the atmosphere and the dynamics of the ocean possibly leading to climatic control, the production of hydrogen including the study of electrolysis, means for capturing solar energy and then fusion." – Europhysics News, September/October 1975.

Research in the CAEs

"The CAEs have not yet been fully recognized as a national resource of trained manpower for research, either by policy-makers or by funding bodies". – J.R. de Laeter, WAIT, Search, October 1975. (See also papers by R.L. Werner (NSWIT) and R.E. Parry (Victoria Institute of Colleges).

Science: A story worth telling

"Science and technology will never receive the budget allocation it deserves while scientists and technologists behave as though their work can only be understood by scientists living in their own little cocoon. – Mr Clyde Cameron, Minister for Science and Consumer Affairs, speaking at a CSIRO Conference, (CORESEARCH, October 1975).

Industrial and Academic Research

"... There is, however, a danger that basic research will become undervalued in the enthusiasm for rapid and obviously useful results. The situation is not helped by chicken-and-egg arguments about whether progress in technology is the result of basic research or vice-versa. They are, of course, bound together in a symbiotic relationship of the most fruitful kind, and the scientific community should constantly explain and emphasize their interdependence. Most of the fundamental research which provides the basis for future technological progress, and which depends on that of the past, is carried out at the universities and it is vital that, even in times of financial stringency, governments be persuaded of the value of this investment in the future. For their part, university teachers should recognize the importance of providing an education which, as well as satisfying the traditional academic criteria, ensures that the expertise necessary to solve the complex problems of modern society is available when called upon." – Professor A. R. Mackintosh, Physics Bulletin, September 1975.

NEWS FROM INDUSTRY

Nuclear chemicals – new agencies

New England Nuclear Corporation and its subsidiary, Analabs Inc., are now represented in Australia by NEN Chemicals (Australia), 6-8 Rowern Court, Box Hill, Vic 3128. The product lines include radioactive sources and compounds, and chromatographic accessories.
Nuclear Enterprises Ltd. of UK, who also offer radioactive materials, are represented by Austronic Engineering Laboratories, at the same address as NEN.

Chinese keyboard for teletype

Information Electronics, of Canberra, have developed a prototype keyboard which can generate over 6000 characters at about 50 characters per minute. The display system uses the classical Chinese dictionary scheme to identify the characters. The prototype will be displayed at the World Technology Fair in Chicago in February. (Search, November 1975).

Cimron digital multimeters

Tecnico Electronics have been appointed exclusive agents for the Cimron Division of California Instruments. A selection guide for digital multimeters is available on request from Tecnico at Premier Street, Marrickville NSW 2204 or 2 High Street, Northcote, Vic 3070

PHYSICS AND TECHNOLOGY

Precise temperature measurement

A new ratio transformer bridge has been developed
for use with platinum resistance thermometers by C. P. Pickup of the National Measurement Laboratory. The bridge has a sensitivity equivalent of 0.001°C, and is designed for simple operation in an industrial environment. A commercial version is being marketed by Leeds and Northrup Australia as Model No. 8078.

**Improvements in optical fibres**

Recent work at the AWA Research Laboratory has led to improvements in the uniformity and strength of long glass fibres. The cross-section is made close to circular by carefully designed gas burners, and the variation in thickness is kept to about 5% by the use of improved mechanical structures to control the drawing. Finally, the tensile stress of the fibre is maintained in service by a polyurethane resin coating which prevents the formation of surface cracks in the glass. *(Search, October 1975)*

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**LETTERS**

**Member or Fellow**

Sir: Mr Gosling’s letter in the October issue of *The Australian Physicist* is really quite fascinating. Quite simply his attitude appears to be “what is it in it for me?” Is it simply old fashioned and non-trendy to remind him that he will get as much from the Institute as he is prepared to put into it? I am led to wonder how much he has put into it and perhaps he would care to tell your readers this in some future issue.

On a more practical note, as an employer of Professional Physicists, I am happy to tell him what Membership and Fellowship means to me. It means that the person concerned has been judged by his peers and found to be a Professional Physicist, academically well based and having sound experience in his field of endeavour. It means that in terms of job opportunity, I am very likely to select him/her in preference to a person on whom no such judgement has been made. It also means that in framing the specialist qualifications of a person, to be appointed at high level in my own field, the requirement for Fellowship is mandatory.

—R. W. Stanford,
Royal Perth Hospital

**Further Comments on Purchasing Scientific Equipment**

Sir: I have received several communications commenting on my article “Purchasing Scientific Equipment in Australia”, published in the August issue of *The Australian Physicist*. I quote below (with the author’s permission) the most interesting:

Dear Dr Jenkin,

I have just been sent copies of your article and that by Mr J. C. Marshall of the American Consulate General, Sydney, from the recent Australian Physicist, by a very well known Adelaide physicist who comments, “it might amuse me!” A second comment reads “Dr Jenkin seems to have been slow to learn!”

The reason for these comments is that the substance of your article is well known to us both and (we) readily agree that this inflated mark-up is deplorable.

My Company has had the pleasure of doing business with both SA Universities and the Institute of Technology for almost a decade during which period they have saved many thousands of dollars which in effect means — more equipment.

Very few British, American and Continental manufacturers of scientific equipment bar us from exporting their equipment to Australia and only then, when an Australian Agent has sole marketing rights. Indeed, in such instances we may be able to purchase direct by paying their Agent’s Commission which still is very much cheaper.

We are a purely purchasing House. We make all enquiries on your behalf according to your specification. Quote you direct and on any subsequent business, arrange packing, shipping insurance, prepare and check shipping documents. We pay cash to the supplier on shipment and any discount that may be allowed to us is passed on to you. Our only remuneration is 5% buying commission on goods actually shipped.

For your satisfaction, I am enclosing a mini-brochure which sets out the services we have to offer, which I hope you will find of interest. Please let me know if you would like further information.

Yours faithfully, etc.,

—John G. Jenkin, *La Trobe University*

The Australian Physicist, January 1976 9
Administrating Science

Sir: Few will disagree with the findings of the science task force assisting the Royal Commission into public administration.

In particular, they dealt with the problem of the ageing scientist, who is 'over the hill', in a sensitive manner. However, they understandably shield clear of the more prevalent phenomenon of 'scientists' who have never bothered to climb the hill in the first place. The upper echelons of the scientific public service abound with such folk.

For example, only about 15% of the first and second division officers concerned with administering science have the basic PhD qualification which one must have to enter the research scientist grade these days. The excuse for this state of affairs is that they are oldies that lacked opportunity because of the absence of the degree in Australia. Many of us overcame this disadvantage one way or another and the excuse doesn't bear analysis. To insist on a PhD as a necessary condition for promotion is likely to squash geniuses who have equally desirable qualities, but such folk are in the minority and can surely be accommodated. When the figures indicate that 85% of management is really equivalent to PhD standard, and only 15% are the genuine article, something is very wrong.

The problem seems to have had its genesis in the early 1950s when the Castieau judgement was handed down in the arbitration court. Scientists argued that their long training and special attributes deserved better recognition. The judge agreed, but the salary rises were to be restricted to those doing scientific research of high merit. Qualifications were also an important criterion to be considered.

A committee, the membership of which could only be described as academically threadbare, was set up in the public service to determine who was worthy of the perk and who wasn't. Pretty soon everyone's work became important research work and a 'tongue in cheek' operation started in which unlikely characters qualified in droves. The committee still exists and, amongst other things, it decides who is worthy to enter the research scientist grades. It is a sort of kangaroo faculty that bestows or withholds PhD equivalence but it is much more choosy these days. The oldies made it in droves and the gate has been shut behind them. After all, you can't have youngsters threatening the system. As the pay packets filled up, the great science surge dwindled. Science had served its purpose, and what better purpose could it serve? It had added to the wealth of scientists. The spirit of the judgement had been perverted, and once past the barrier, one was deemed to be a PhD equivalent. Never again need one have one's miserably poor contributions to knowledge weighed by incompetent committees.

Those who were really dedicated, and stuck to their science, tended to stay put in the system as the new management cult emerged. This cult says that there are born managers and born non-managers. A good scientist is unlikely to be a good manager. If one is a good manager, one can manage anything, including science. One can become an expert in research work without ever having done any research of substance. The cult enables the system to preserve itself. Whether one is a good or poor manager is a subjective judgement in the hands of the existing managers. It is all very cosy.

If the task force report is ever implemented, it is to be hoped that the top positions will be widely advertised, and not just filled with the same old faces. If this is not done, the best of intentions will be frustrated, as was the case with the Castieau judgement.

David S. Robertson
Stirling, S.A.

CLASSIFICATION OF SCIENCE

Hugh of St. Victor (d. 1141 A.D.)

Chapter 16: Concerning Physics

Physics searches out and considers the causes of things as found in their effects, and the effects as derived from certain causes:

Whence the tremblings of earth do rise, or from what cause the deep seas swell;

Whence grasses grow or beasts are moved with wayward wrath and will;

Whence every sort of verdant shrub, or rock, or creeping things.

Virgil, Georgics II

The word physics means nature, and therefore Boethius places natural physics in the higher division of theoretical knowledge. The science is also called physiology, that is, discourse on the natures of things, a term which refers to the same matter as physics. Physics is sometimes taken broadly to mean the same as theoretical science, and taking the work in this sense, some persons divide philosophy into three parts — into physics, ethics, and logic. In this division the mechanical sciences find no place, philosophy being restricted to physics, ethics, and logic alone.


(American Journal of Physics, 43, 7, July 1975)
GENERAL

The Institute has continued to function at Branch and Group levels as in previous years, but a major new development in 1975 has been its growing involvement in the area of Government Science Policy. On the administrative side, inflationary pressures have exercised the Council and Executive committee throughout the year.

Two major reports have been submitted to the Government. In January a report, entitled "Remarks on the Future of Nuclear Physics in Australia", prepared by members of the Nuclear and Particle Physics Group was submitted to the Minister for Science and Consumer Affairs. In response to the Ministerial green paper on Antarctic Research in October the Institute forwarded a report, entitled "Australian Scientific Research in Physics in the Antarctic" to the Minister for Science and Consumer Affairs. The Institute maintains a watching brief on matters of general science policy through the Science Policy Committee of Council which has functioned very effectively in 1975.

During the May Council meeting a telegram was sent to the Minister for Science and Consumer Affairs expressing concern at the delay in the announcement of the interim ASTEC committee. Names of the eleven initial members were announced a day later and these included a former President of the Institute, Professor Robert Street. The remaining committee position was eventually filled by another Fellow of the Institute, Dr K. Rachel Maksimow.

Two issues of major concern to the whole scientific community were the threatened dismemberment of certain divisions of the CSIRO and financial cuts in the budget for the ARGC. A telegram of complaint to the Minister for Science and Consumer Affairs regarding the CSIRO affair was sent with the unanimous approval of Council. Because the scientific community as a whole reacted with swiftness and zeal to the ARGC issue, no action was taken by Council on that matter.

Although its services were offered to the Parliamentary Inquiry on Uranium mining, the Institute will make no submission since it does not have a single point of view to present. The services of the Institute were also offered to the Ranger Inquiry on environmental aspects of Uranium mining and enrichment, but no request to provide evidence has been received.

Highlights from the year's activities include the lectures by Nobel Laureate, Professor Murray Gell-Mann at the Nuclear and Particle Physics Group Summer School in February, and the lectures presented to large audiences in both Sydney and Canberra by Professor P.A.M. Dirac O.M. during the middle of the year. The Victorian Branch continued its very successful programme of Youth lectures at two centres. In Queensland a successful venture was a school lecture held at Toowoomba.

The former Assistant Secretary, Mrs. P. E. Smith resigned from the Institute in July and her place has been taken by Miss B. Doddrell.

FINANCE

The accounts for the year ended 30th September 1975 are presented in the same form as last year. The consolidated accounts comprise the individual accounts of the Branches, Groups, Council Controlled funds, and "The Australian Physicist". The Beneficial Fund is independent from the Institute Funds and is reported separately. Members should have received financial statements directly from the Branches and Groups to which they belong.

The consolidated Institute accounts show a deficit of $2099 which resulted from the combination of a deficit of $4223 for Council controlled funds, a deficit of $600 for "The Australian Physicist" and a surplus of $2724 in Branch and Group funds. The latter surplus is more than accounted for by the transfer into funds held on behalf of the branches and groups of $2677 as undrawn grants. By special request the Branches and Groups refrained from drawing all their grants before the end of the financial year and the beginning of collection of subscriptions for 1976. Thus a liquidity crisis was avoided in the central office bank account and our investment portfolio remains intact at least for the time being. The branches and groups have now withdrawn more than half of the $2677 in order to continue their activities for the last part of the 1975 calendar year.

By a good fortune a rise in printing costs of about $1700 did not materialize and this together with careful management enabled the editor of AP to assure Council that he would not require the full $12000 originally budgeted for: thus the grant to AP was reduced to $9000. Although the originally expected deficit of $7040 did not arise in 1975 the state of the economy is hardly such as to induce undue optimism for future predictions.

Table I shows how the income received by central office was disbursed both for the current year and how it is expected to be disbursed for the succeeding year 1976. It is clear that the 50% rise in subscriptions has enabled Council to restore the balance between the various components. However, as inflation goes on those components which involve employment of staff, such as the office, or the buying of services, such as AP, will increase in cost and without a corresponding rise in subscriptions (10-20%) Branch and Group activities will suffer.

MEMBERSHIP

The Institute records with regret the deaths of Mr R. D. Carman (Member), Dr W. W. Mansfield (Member), Mr A. N. Pickering (Member), Mr D. G. Salter (Member), Dr A. S. Pearl (Graduate), Mr D. H. Sofier (Graduate) and Mr R. B. Swann (Graduate).

The Membership figures at the 21st November 1975 are shown in Table II. The figures in brackets indicate the changes over the past year. It is regretted that the names of 26 corporate members

<table>
<thead>
<tr>
<th>TABLE I - FINANCIAL SUMMARY</th>
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<tbody>
<tr>
<td>1975</td>
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<tr>
<td>24%</td>
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<tr>
<td>27%</td>
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<td>23%</td>
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<td>16%</td>
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<td>7%</td>
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<td>3%</td>
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The Australian Physicist, January 1976
and 3 non-corporate members had to be removed from the Register for non-payment of annual subscriptions. The membership continues to increase slowly. Corporate membership rose by nearly 4.6% to 1577, and overall membership by just under 2.1% to 7.75. Company subscribers now number 20, a loss of 2 since last year.

A committee was set up to assess a Multidiscipline degree course to determine whether the qualification obtained was of sufficient standard to be acceptable for Graduateship. Qualifications at present acceptable for Graduateship are shown in Table III. Table IV lists those societies which have been declared cognate so that their members may become Group Affiliates.

Since September 1974 there have been no requests for assessment of overseas professional qualifications.

### TABLE II - MEMBERSHIP AT 21 NOVEMBER 1975

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<thead>
<tr>
<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>
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<tbody>
<tr>
<td>Hon. Fellow</td>
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<td>1</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
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<td>15</td>
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<td>191</td>
<td>34</td>
<td>66</td>
<td>20</td>
<td>185</td>
<td>58</td>
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<td>Total Members</td>
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<td>103</td>
<td>173</td>
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<td>1</td>
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*Unattached †Overseas

### TABLE III - QUALIFICATIONS RECOGNIZED BY THE INSTITUTE FOR GRADUATESHIP

(a) A pass degree in physics from any Australian or New Zealand university;
(b) A degree in physics from any university recognised by The Institute of Physics (London);
(c) Any of the following degrees or diplomas with physics as a major subject:

- Canberra College of Advanced Education: B App Sc Degree (with special requirements as to physics content);
- The Capricornia Institute of Advanced Education: B App Sc (Physics);
- Griffith Institute of Technology: B App Sc (Multidisciplinary) (with special requirements as to physics content);
- Darling Downs Institute of Advanced Education: B App Sc (Physics);
- Gordon Institute of Technology: Diploma of Applied Physics;
- The New South Wales Institute of Technology: Diploma in Technology with Major in Physics;
- Queensland Institute of Technology: B App Sc (Physics);
- Royal Melbourne Institute of Technology: B App Sc Degree (Physics); Fellowship Diploma in Applied Physics or Applied Physics (Meteorology);
- The School of Mines and Industries, Ballarat: B App Sc Degree (double major in Physics); Diploma in Applied Physics;
- South Australian Institute of Technology: B App Sc Degree in Applied Physics;
- Sydney Technical College: The ASTC Diploma in Physics, provided it was obtained prior to 1964;
- The University of Adelaide: B: Tech Degree in Industrial Physics; B App Sc Degree in Applied Physics on work done at the South Australian Institute of Technology;
- University of Melbourne: B App Sc Degree, provided it includes Physics at the third level, Electronics and Mathematics;
- The University of New South Wales: B Sc Degree in Textile Physics;
- Western Australian Institute of Technology: B App Sc Degree.

### "THE AUSTRALIAN PHYSICIST"

The production and distribution of "The Australian Physicist" has continued successfully. Special inserts, and the inclusion of Late News on the covers, have produced a trend towards shorter articles and more topical material. Increases in postal charges have affected distribution costs, but the cost to the Institute has been kept as low as possible in order to help minimise the overall deficit of the Institute for the year.

Associate Editors attended a meeting with the Editor in Sydney in May and they have played an increasing role since that time. The success of the year’s operations can be attributed to a good deal of willing effort by many members of the Institute.

It is with regret that we record the resignation of the Editor, Dr J. R. Bird, effective upon completion of the December 1975 issue. Dr Bird’s tenure as editor has been characterised by outstanding financial management and the continued production of a publication of considerable value to the members of the Institute.

At the November Council meeting, Mr W. S. Boundy of Adelaide was appointed Editor of "The Australian Physicist" from January 1976. Because Mr Boundy does not return from overseas until the end of the year, the January issue is being edited by Dr E. R. Sandercock. An Editorial Committee is being set up in Adelaide.

### INSTITUTE BRANCH AND GROUP ACTIVITY

The Twelfth Annual General Meeting of the Institute was held at the University of Tasmania on 29 January 1975. The Vice-President was in the Chair and 20 members were present. The unconfirmed minutes were published in the April 1975 issue of "The Australian Physicist". Two Council meetings each lasting two days were held in May and November. The Executive Committee met seven times during the year.

12 The Australian Physicist, January 1976
The eleventh Pawsey Memorial Lecture was held in Canberra and was given by Mr. John Bolton of the CSIRO Parkes Radio Observatory. His lecture, entitled "The Changing Universe", was very well received by an audience of more than 250.

Two Summer Schools were held early in the year. That organized by the Nuclear and Particle Physics Group was attended by 95 participants and was held at Goolwa, S.A., in February. Invited speakers were Professors M. Gell-Mann (Caltech), S. Hanna (Stanford) and W. Turchinetz (MIT). The Summer School on Astrophysics, attended by 45 participants, was held at the University of Tasmania from 28-31 January. Invited lecturers were Drs. J. Ahles and T. W. Cole (CSIRO Division of Radio-physics), Professor C. B. A. McCrudden (University of Sydney) and Dr. L. J. Geeben (Monash University).

Plans for the Second National Congress to be held at the University of New South Wales 23-27 August, 1976, are well advanced. This is being organised by the NSW Branch of the Institute.

Branches have maintained an excellent tradition of regular lectures, in most cases monthly throughout the year. The Queensland Branch has experimented with lectures given first in Brisbane and then repeated at a major country centre. Professor P. A. M. Dirac’s lecture, "The Development of Quantum Mechanics", attracted an audience of more than 500 in Sydney. In Canberra, the ACT Branch debated the issue of nuclear power and has set up a small sub-committee to consider the matter further. An excellent precedent was set by the ACT and NSW Branches in joining together on a visit to the Anglo-Australian Telescope at the Siding Spring Observatory.

The Groups, which are national in character, have each developed different patterns of activity. The Biophysics Group joined the Australian Regional Group Hospital Physicists’ Association in running the 15th Annual Congress on Physics in Medicine and Biology. Plans for the Australian Vacuum Physics conference in Brisbane in July 1976 are advanced. In addition there is to be a course in Vacuum Technology. The Nuclear and Particle Physics Group hopes to publish the lecture notes from its Summer School held in February this year. A Summer School on Low Energy Nuclear Physics is planned for February 1977 and the International Conference on Nuclear Reactors is to be held in Canberra in August 1978.

A report to the November Council meeting by the Education Group has led to the setting up of an Education Committee of Council, and the possibility of Branch Education Committees. It is felt that physics education is a vitally important matter and should be a major interest of Council.

CO-OPERATION WITH OTHER SCIENTIFIC ORGANISATIONS

The Institute values its membership of the Conference of Allied Societies which meets twice a year for discussion of topics of mutual interest. Associated societies are the Australian Institute of Mining and Metallurgy, the Institute of Engineers Australia, the Royal Australian Chemical Institute, the Australian Institute of Agricultural Science and the Institute of Surveyors Australia.

The Institute has reciprocal arrangements with a number of other societies whereby a member of one Society visiting the other’s country can be helped in establishing contacts with other physicists there, and enjoy most of the benefits of membership of the other Society (without subscription and with no voting rights) on a short term basis. These reciprocal arrangements exist between the AIP and the American Institute of Physics, the Canadian Association of Physicists, the European Physical Society, the Institute of Physics, London, the Institute of Physics, Singapore, the Physical Society of Japan and the South African Institute of Physics.

The Institute is represented on a number of bodies as listed below.

PHYSICS ARCHIVES

The Institute has received a certain amount of material which belonged to the late Associate Professor E. O. Hercus of Melbourne University. This will be sent in due course to the Adolph Baser Library, Australian Academy of Science, where the Institute’s older records are now kept.

MEMBERSHIP OF COUNCIL FOR 1975

The following members of the Executive took office in February 1975 and complete their term at the conclusion of the Fourteenth Annual General Meeting in 1977:

**President**
- Dr. J. G. Campbell

**Vice-President**
- Dr. F. M. Smith

**Hon. Registrar**
- Dr. J. R. Mackenzie

**Hon. Treasurer**
- Dr. J. R. Mackenzie

**Hon. Secretary**
- Dr. J. R. Pilbow

Dr. F. J. Jacke held office on Council (ex officio) as Immediate Past President.

Each Branch was represented on Council by its Chairman, who holds office until 31 December 1975 as follows:

**ACT Branch**
- Dr. P. B. Tracy

**NSW Branch**
- Prof. H. J. Goldsmith

**Qld. Branch**
- Prof. R. L. Segall

**SA Branch**
- Prof. J. H. Carver

**Tas Branch**
- Dr. I. A. Newman

**Vic Branch**
- Prof. H. H. Bolotin

**WA Branch**
- Dr. J. R. de Lacter

OFFICERS OF THE INSTITUTE

**Secretary:** Dr. J. R. Pilbow

**Assistant Secretary:** Miss B. Doddrell

**Editorial Committee:** "The Australian Physicist"

**Editor:** Dr. J. R. Bird

**Assistant Editors:** Dr. I. S. Falconer, Dr. P. E. Giddor

**Book Reviews:** Mr. G. A. Bell

**Circulation:** Mr. E. G. Thwaite

**Secretary:** Dr. G. R. Hogg

**Treasurer:** Dr. C. J. Howard

**Associate Editors:** Dr. P. F. Brown, Dr. J. C. Macfarlane, Professor H. C. Webster, Dr. P. W. Seymour, Dr. P. M. McCluskie, Dr. J. D. Cashion, Dr. J. R. de Lacter

**Auditor:** Maxwell Witherow & Co. (Accountants)

**Trustees for Beneficial Fund:** Dr. J. K. Mackenzie (ex officio), Professor H. C. Bolton, Dr. R. W. Crompton, Dr. T. M. Sabine, Dr. J. G. Campbell

**Returning Officer:** Professor B. M. Spicer

**Membership Committee:** Dr. J. L. Rouse (Chairman), Professor H. C. Bolton, Dr. J. F. C. Darby. EX officio members: Dr. J. G. Campbell, Dr. J. K. Mackenzie, Dr. J. R. Pilbow

**Finance Advisory Committee:** The Executive

**AIP Representative on Joint Office Management Committee:** Dr. J. R. Pilbow, Dr. J. K. Mackenzie, Dr. J. L. Rouse

BRANCH AND GROUP COMMITTEES

**ACT Branch:** Dr. P. B. Tracey (Chairman), Mr. J. P. Lonergan (Vice-Chairman), Mr. C. S. Newton (Secretary), Mrs. E. M. Richardson (Treasurer), Mr. G. E. Barlow, Dr. A. M. Baxter, Dr. H. C. Crompton, Dr. M. D. Finlayson, Mr. J. M. Goodspeed, Dr. A. F. Nicholson, Dr. J. P. Raynor, Professor G. V. H. Wilson

**NSW Branch:** Professor H. J. Goldsmith (Chairman), Dr. J. Macfarlane (Vice-Chairman), Associate Professor D. Morton (Secretary), Dr. J. Robertson (Treasurer), Dr. N. Bignell, Dr. C. Burton, Dr. P. M. Kelly, Dr. R. E. Collins, Dr. G. Paul, Professor C. D. Elyett, Dr. B. Window

**Qld Branch:** Professor P. L. Segall (Chairman), Mr. R. E. Dunlop (Vice-Chairman), Associate Professor D. Morton, Dr. H. W. Lucas (Treasurer), Professor J. D. Whitehead

**Tas Branch:** Dr. I. A. Newman (Chairman), Dr. J. E. Humble (Vice-Chairman), Dr. J. R. Fox (Secretary-Treasurer)

**Vic Branch:** Professor H. H. Bolotin (Chairman), Associate Professor K. D. Cole (Vice-Chairman), Mr. J. D. Buntine (Secretary), Mr. D. L. Swinger (Treasurer), Dr. J. D. Cashion, Dr. J. G. Crecy, Mr. R. J. De Groot, Mr. W. G. Durant, Mr. J. Liesegang

**WA Branch:** Dr. B. W. Thomas (Chairman), Dr. R. Green (Vice-Chairman), Dr. M. J. Lynch (Secretary), Dr. B. H. O’Connor (Treasurer), Dr. J. B. Swan, Professor B. Mainbridge, Mr. M. Farrell, Dr. J. Black, Dr. J. Robins, Mr. B. Hartley, Mr. K. Tobin, Mr. S. Gunson, Dr. J. R. de Lacter, Mr. R. Fley, Dr. J. Chute

**SA Branch:** Professor J. H. Carver (Chairman), Dr. E. L. Murray (Vice-Chairman), Dr. R. T. Cullih (Secretary), Dr. R. Randles (Treasurer), Dr. M. J. Bosher, Dr. G. L. Goodwin, Dr. R. W. Clay, Mr. J. Molyha, Dr. S. O. Martin, Mr. C. H. Low, Mr. K. H. Lloyd

**BIOPHYSICS GROUP:** Mr. L. D. Oliver (Secretary), Dr. J. I. Black (Treasurer)

**EDUCATION GROUP:** Dr. G. L. Paul (Chairman), Mr. L. G. Little (Vice-Chairman), Dr. F. P. Gould (Secretary-Treasurer), Dr. P. E. Clark, Mr. W. G. Durant, Mr. I. Guy, Mr. D. Knights, Mr. W. A. Miller, Mr. I. Sefson, Dr. R. Woolcott.

**VACUUM PHYSICS GROUP:** to September Mr. D. L. Swinger (Chairman), Dr. N. R. Avery (Secretary), Dr. P. H. Canning (Treasurer), from September — Mr. J. A. Davies (Chairman), Dr. D. R. Arnott (Vice-Chairman), Mr. T. G. Lewis (Secretary), Dr. I. R. Cowling (Treasurer).
NUCLEAR AND PARTICLES PHYSICS GROUP: Professor I. E. McCarthy (Chairman), Associate Professor R. Taylor (Vice-Chairman), Dr R. F. Barrett (Secretary-Treasurer), Professor B. M. Spier, Dr I. F. Bubb, Dr J. R. Bird, Dr M. J. Kenny, Professor G. Opal, Professor H. H. Bolotin, Professor C. A. Hurst, Professor J. Newton, Professor D. Peacock, Professor A. Poletti.

REPRESENTATION ON OTHER BODIES
Council gratefully acknowledges the services of those members who represented the Institute on the Councils or Committees of other bodies; they were:
- Australian Journal of Physics Advisory Committee: Dr R. W. Crompton
- National Association of Testing Authorities: Professor L. W. Davies
- Australian National Committee on Illumination: Mr J. E. Shaw
- Australasian Institute of Radiology: Mr J. F. Richardson
- Acoustic Standards Committee of SAA: Dr R. W. R. Munsey
- Australian Academy of Science National Committee for Physics: Dr. F. J. Jacka

### CONSOLIDATED BALANCE SHEET AS AT 30th SEPTEMBER, 1975

#### 1974 ACCUMULATED FUNDS

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance at 1st October 1974</td>
<td>12,717</td>
</tr>
<tr>
<td>Less Deficit for year</td>
<td>2,099</td>
</tr>
<tr>
<td>Less Specifically allocated to Branches &amp; Groups</td>
<td>4,352</td>
</tr>
<tr>
<td>Branches &amp; Groups - Balance at 1st October 1974</td>
<td>13,509</td>
</tr>
<tr>
<td>Add allocation of General Fund</td>
<td>4,352</td>
</tr>
<tr>
<td>Total</td>
<td>26,226</td>
</tr>
</tbody>
</table>

#### 1974 CURRENT ASSETS

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash on Hand</td>
<td>182</td>
</tr>
<tr>
<td>Cash at Bank</td>
<td>6,506</td>
</tr>
<tr>
<td>Cash on Deposit - Permanent Building Society</td>
<td>4,266</td>
</tr>
<tr>
<td>Accounts Recoverable</td>
<td>3,039</td>
</tr>
<tr>
<td>Stock on Hand at Cost</td>
<td>1,193</td>
</tr>
<tr>
<td>Total</td>
<td>15,186</td>
</tr>
</tbody>
</table>

#### 1974 INVESTMENTS - at Cost

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debentures etc. which are dealt in on Exchanges</td>
<td>19,844</td>
</tr>
<tr>
<td>a Prescribed Stock Exchange</td>
<td>19,844</td>
</tr>
</tbody>
</table>

#### 1974 FIXED ASSETS

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furniture, Fittings &amp; Plant at Deemed Value 1967</td>
<td>896</td>
</tr>
<tr>
<td>at Cost</td>
<td>1,353</td>
</tr>
<tr>
<td>Stock on Hand at Cost</td>
<td>2,249</td>
</tr>
<tr>
<td>Total</td>
<td>1,333</td>
</tr>
</tbody>
</table>

### COUNCIL FUNDS – BALANCE SHEET AS AT 30th SEPTEMBER 1975

#### 1974 ACCUMULATED FUNDS

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance at 1st October 1974</td>
<td>7,996</td>
</tr>
<tr>
<td>Less Deficit for Year</td>
<td>688</td>
</tr>
<tr>
<td>Due to Benevolent Fund at Call</td>
<td>7,208</td>
</tr>
<tr>
<td>Subscriptions in Advance</td>
<td>1,046</td>
</tr>
<tr>
<td>Funds held on behalf of Branches and Groups</td>
<td>450</td>
</tr>
<tr>
<td>Provisions for Specific Purposes for Change</td>
<td>418</td>
</tr>
<tr>
<td>of Subscription Year</td>
<td>208</td>
</tr>
<tr>
<td>Year</td>
<td>13,509</td>
</tr>
<tr>
<td>Total</td>
<td>16,131</td>
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</table>

#### 1974 CURRENT ASSETS

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash on Hand</td>
<td>7,308</td>
</tr>
<tr>
<td>Cash on Deposit - Western Pacific Perm.</td>
<td>3,085</td>
</tr>
<tr>
<td>in Bank</td>
<td>4,223</td>
</tr>
<tr>
<td>Deposits on Call</td>
<td>100</td>
</tr>
<tr>
<td>Bldg. Society</td>
<td>628</td>
</tr>
<tr>
<td>Accounts Recoverable</td>
<td>170</td>
</tr>
<tr>
<td>Stock on Hand at Cost</td>
<td>924</td>
</tr>
<tr>
<td>Stock on cost</td>
<td>332</td>
</tr>
<tr>
<td>Total</td>
<td>2,154</td>
</tr>
</tbody>
</table>

#### 1974 INVESTMENTS - at Cost

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debentures which are dealt on prescribed Stock</td>
<td>19,844</td>
</tr>
<tr>
<td>Exchange</td>
<td></td>
</tr>
</tbody>
</table>

#### 1974 FIXED ASSETS

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furniture, Fittings and Plant at Deemed Value</td>
<td>896</td>
</tr>
<tr>
<td>1967 at Cost</td>
<td>1,353</td>
</tr>
<tr>
<td>Stock in hand at cost</td>
<td>2,249</td>
</tr>
<tr>
<td>Total</td>
<td>1,333</td>
</tr>
</tbody>
</table>

### $36,471

### $31,645

### $36,471

### $31,645

14 The Australian Physicist, January 1976
### CONSOLIDATED STATEMENT OF INCOME & EXPENDITURE FOR THE YEAR ENDED 30th SEPTEMBER 1975

<table>
<thead>
<tr>
<th>1974</th>
<th>977</th>
<th>Deficit from normal year's activities after making the following Charges and Provisions</th>
<th>4.183</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Provision for Long Service Leave</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>840</td>
<td>Auditors Remuneration for – Audit Services</td>
<td>876</td>
<td></td>
</tr>
<tr>
<td>–</td>
<td>Other Services</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>117</td>
<td>Depreciation of Fixed Assets – Directors Remuneration and Emoluments</td>
<td>108</td>
<td></td>
</tr>
<tr>
<td>$1,057</td>
<td></td>
<td></td>
<td>$984</td>
</tr>
<tr>
<td>2,135</td>
<td>Less Interest Received from Investments etc.</td>
<td></td>
<td>2,084</td>
</tr>
<tr>
<td>(1,158)</td>
<td>Deficit (Surplus) before Extraordinary Items</td>
<td></td>
<td>2,099</td>
</tr>
<tr>
<td>500</td>
<td>Add Extraordinary Items</td>
<td></td>
<td></td>
</tr>
<tr>
<td>–</td>
<td>Transfers from Provisions – Stationery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$(1,658)</td>
<td>Net Deficit (Surplus) for Year</td>
<td></td>
<td>$2,099</td>
</tr>
</tbody>
</table>

### COUNCIL FUNDS – INCOME & EXPENDITURE FOR YEAR ENDED 30th SEPTEMBER 1975

<table>
<thead>
<tr>
<th>1974 Income from Normal Sources</th>
<th>1974 EXPENDITURE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Members’ Subscriptions</strong></td>
<td><strong>Administrative</strong></td>
</tr>
<tr>
<td>for 1975 26,345</td>
<td>6,936 Salaries &amp; Wages 10,788.00</td>
</tr>
<tr>
<td>Members’ Subscriptions 1,189</td>
<td>Transfer to Provision for Long Service Leave 100</td>
</tr>
<tr>
<td>for 1974 939</td>
<td>523.00</td>
</tr>
<tr>
<td>Group Subscriptions for 1975 470</td>
<td>436 Rent &amp; Cleaning 596.00 11,384</td>
</tr>
<tr>
<td>Bank and Investment Income 1,760</td>
<td>3,201 Printing, Stationery &amp; Insurance 2,209.00</td>
</tr>
<tr>
<td>Exhibitions and Summer 897</td>
<td>920 Postage, Telephone &amp; Cartage 948.00</td>
</tr>
<tr>
<td>Schools etc. 262.00</td>
<td></td>
</tr>
<tr>
<td><strong>Extraordinary Income</strong></td>
<td><strong>Branch and Group Activities:</strong></td>
</tr>
<tr>
<td>Transfer from Provisions for – 500</td>
<td>Grants 1,140.00 7,830.00 9,000.00</td>
</tr>
<tr>
<td>Stationery</td>
<td>5,450</td>
</tr>
<tr>
<td>Deficit for Year 689</td>
<td>Visiting Lecturers 583.80 767.00</td>
</tr>
<tr>
<td></td>
<td>975</td>
</tr>
<tr>
<td></td>
<td>Conferences and Lectures 1,251</td>
</tr>
<tr>
<td></td>
<td>Archives Grant 1,104.00</td>
</tr>
<tr>
<td></td>
<td>Interest paid to Branches 85.00</td>
</tr>
<tr>
<td></td>
<td>Groups &amp; Ben. Fund 977</td>
</tr>
<tr>
<td></td>
<td>989.00</td>
</tr>
<tr>
<td></td>
<td>$36,029.00</td>
</tr>
<tr>
<td></td>
<td>$31,850.00</td>
</tr>
</tbody>
</table>

### INVESTMENTS AT COST AS AT 30th SEPTEMBER 1975

<table>
<thead>
<tr>
<th>1974</th>
<th>Nom</th>
<th>Cost</th>
<th>%</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,000</td>
<td>(3,000) Associated Securities Ltd.</td>
<td></td>
<td>8¼</td>
<td>5. 9.75</td>
</tr>
<tr>
<td>802</td>
<td>(800) L.A.C.</td>
<td>8¼</td>
<td>31. 3.76</td>
<td></td>
</tr>
<tr>
<td>788</td>
<td>(800) C.U.B.</td>
<td>6¼</td>
<td>31.12.76</td>
<td></td>
</tr>
<tr>
<td>2,753</td>
<td>(3,000) B.P.</td>
<td>7</td>
<td>31.23.76</td>
<td></td>
</tr>
<tr>
<td>1,012</td>
<td>(1,000) Ford Motor Co.</td>
<td>7¼</td>
<td>31.23.76</td>
<td></td>
</tr>
<tr>
<td>2,000</td>
<td>(2,000) Associated Securities Ltd.</td>
<td>13¼</td>
<td>31.5.77</td>
<td></td>
</tr>
<tr>
<td>780</td>
<td>(800) I.C.I</td>
<td>6¼</td>
<td>31.30.77</td>
<td></td>
</tr>
<tr>
<td>1,936</td>
<td>(2,000) ESSO</td>
<td>7</td>
<td>31.7.78</td>
<td></td>
</tr>
<tr>
<td>1,005</td>
<td>(1,000) ESANDA</td>
<td>8¼</td>
<td>31.15.77</td>
<td></td>
</tr>
<tr>
<td>808</td>
<td>(800) FNICB</td>
<td>8¼</td>
<td>31.31.79</td>
<td></td>
</tr>
<tr>
<td>2,000</td>
<td>(2,000) Alliance Holdings Ltd.</td>
<td>12</td>
<td>31.5.79</td>
<td></td>
</tr>
<tr>
<td>1,640</td>
<td>(1,700) B.H.P.</td>
<td>7</td>
<td>31.1.80</td>
<td></td>
</tr>
<tr>
<td>1,030</td>
<td>(1,000) I.C.I</td>
<td>8¼</td>
<td>31.31.80</td>
<td></td>
</tr>
<tr>
<td>290</td>
<td>(300) B.H.P.</td>
<td>7</td>
<td>31.10.81</td>
<td></td>
</tr>
<tr>
<td>19,844</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Australian Physicist, January 1976 15
### FUNDS HELD ON BEHALF OF THE BRANCHES & GROUPS

<table>
<thead>
<tr>
<th>BRANCHES:</th>
<th>Deduct at 1.10.74</th>
<th>Add Undrawn Grants</th>
<th>Profits from Activities</th>
<th>Annual Interest</th>
<th>Balance at 30.9.75</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.C.T.</td>
<td>794</td>
<td></td>
<td>56</td>
<td>850</td>
<td></td>
</tr>
<tr>
<td>N.S.W.</td>
<td>2,829</td>
<td>525</td>
<td>198</td>
<td>3,552</td>
<td></td>
</tr>
<tr>
<td>Qld.</td>
<td>880</td>
<td>181</td>
<td>62</td>
<td>1,123</td>
<td></td>
</tr>
<tr>
<td>S.A.</td>
<td>2,260</td>
<td>561</td>
<td>119</td>
<td>2,968</td>
<td></td>
</tr>
<tr>
<td>Tas.</td>
<td>214</td>
<td>214</td>
<td></td>
<td>229</td>
<td></td>
</tr>
<tr>
<td>Vic</td>
<td>4,511</td>
<td>100</td>
<td>295</td>
<td>5,801</td>
<td></td>
</tr>
<tr>
<td>W.A.</td>
<td>995</td>
<td>400</td>
<td>70</td>
<td>1,465</td>
<td></td>
</tr>
<tr>
<td>GROUPS:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biophysics</td>
<td>3</td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>475</td>
<td>100</td>
<td>26</td>
<td>401</td>
<td></td>
</tr>
<tr>
<td>Nuc. &amp; Part. Phys.</td>
<td>13</td>
<td>1</td>
<td>1</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Vacuum Phys.</td>
<td>535</td>
<td>45</td>
<td>115</td>
<td>1,175</td>
<td></td>
</tr>
</tbody>
</table>

$13,509 $1,006 $2,677 $1,724 $957 $17,861

### THE AUSTRALIAN PHYSICIST – INCOME & EXPENDITURE ACCOUNT FOR YEAR ENDED 30th SEPTEMBER, 1975

#### INCOME

<table>
<thead>
<tr>
<th>1974</th>
<th>1975</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,552</td>
<td>656</td>
</tr>
<tr>
<td>8,300</td>
<td>9,000</td>
</tr>
<tr>
<td>531</td>
<td>588</td>
</tr>
<tr>
<td>2,032</td>
<td>1,883</td>
</tr>
<tr>
<td>617</td>
<td>890</td>
</tr>
<tr>
<td>296</td>
<td>425</td>
</tr>
</tbody>
</table>

#### EXPENDITURE

<table>
<thead>
<tr>
<th>1974</th>
<th>1975</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special Supplements &amp; Inserts</td>
<td>2,993</td>
</tr>
<tr>
<td>Grant from A.I.P</td>
<td>7,215</td>
</tr>
<tr>
<td>Reprints &amp; Extracts</td>
<td>450</td>
</tr>
<tr>
<td>Advertising</td>
<td>2,561</td>
</tr>
<tr>
<td>Sales &amp; Subscriptions</td>
<td>331</td>
</tr>
<tr>
<td>Interest Receivable</td>
<td>60</td>
</tr>
</tbody>
</table>

Deficit: 600

$14,528

### BALANCE SHEET AS AT 30th SEPTEMBER 1975

<table>
<thead>
<tr>
<th>1974</th>
<th>1975</th>
</tr>
</thead>
<tbody>
<tr>
<td>6,216</td>
<td>4,428</td>
</tr>
<tr>
<td>195</td>
<td>217</td>
</tr>
<tr>
<td>4,427</td>
<td>4,095</td>
</tr>
</tbody>
</table>

#### CURRENT LIABILITIES

- Accounts Payable: 4,428
- Subscriptions in Advance: 217

#### CURRENT ASSETS

- Bank Accounts: 369
- Deposits at call: 4,095
- Permanent Building Societies: 2,709
- Accounts Receivable: 1,349
- Stock on Hand at cost: 944
- Accrued Income (Interest): 111

#### ACCUMULATED FUNDS

- Balance at 1.10.75: 1,654
- Surplus (Deficit) for year: 1,054

$8,065

### BALANCE SHEET OF BENEVOLENT FUND AS AT 30th SEPTEMBER 1975

<table>
<thead>
<tr>
<th>1974</th>
<th>%</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>196</td>
<td>4.75</td>
<td>1.275</td>
</tr>
<tr>
<td>1,300</td>
<td>9.2</td>
<td>31.5</td>
</tr>
<tr>
<td>393</td>
<td>5.0</td>
<td>1.775</td>
</tr>
<tr>
<td>496</td>
<td>5.0</td>
<td>1.7</td>
</tr>
<tr>
<td>500</td>
<td>5.0</td>
<td>1.727</td>
</tr>
<tr>
<td>500</td>
<td>7.2</td>
<td>1.900</td>
</tr>
<tr>
<td>(1,400)</td>
<td>5.625</td>
<td>1.129</td>
</tr>
</tbody>
</table>

$3,385

### BENEVOLENT FUND INVESTMENTS AT COST

- S.E.C. Loan
- Commonwealth Special Bonds Series 2D
- M.M.B.W.
- S.E.C. Loan
- Electricity Trust of S.A.

$3,661.30

16 The Australian Physicist, January 1976
REPORT OF COUNCILLORS

Your Councillors submit herewith the following audited financial statements:

Income and Expenditure Account made up for the year ended 30th September 1975

Balance Sheet as at the end of the financial year then ended.

Your Councillors report that:

1. The net deficit of the Institute for the financial year amounted to $2099.

2. Prior to the making out of the Income & Expenditure Account and the Balance Sheet your Councillors took reasonable steps to ascertain what action had been taken in relation to the writing off of bad debts where necessary and the making of provision for doubtful debts and are satisfied that there are no known bad debts to be written off and no provision is considered necessary for doubtful debts.

3. At the date of this report your Councillors are not aware of any circumstances which would render the position as regards accounts receivable as stated above inadequate to any substantial extent.

4. At the date of this report your Councillors are not aware of any circumstances which would render the values attributed to current assets in the accounts misleading.

5. At the date of this report no charge on the assets of the Institute has arisen since the end of the financial year which secures the liabilities of any other person; and no contingent liability has arisen since the end of the financial year.

6. No contingent or other liability has become enforceable or is likely to become enforceable within the period of twelve months after the end of the financial year which in the opinion of your Councillors, will or may affect the ability of the Institute to meet its obligations when they fall due;

7. The result of the Institute’s operations during the financial year were, in the opinion of your Councillors, not substantially affected by any item, transaction or event of a material and unusual nature save for the transfer from Provisions for Specific Purposes of $500 as stated in the Income & Expenditure Statement for the 1974 year did not recur;

8. There has not arisen in the interval between the end of the financial year and the date of the report any item, transaction or event of a material and unusual nature likely, in the opinion of your councillors to affect substantially the results of the Institute’s operations for the next succeeding financial year;

9. Since the end of the previous financial year no Councillor has received or become entitled to receive any benefit not disclosed in the accounts by reason of a contract made by the Institute with the Councillor, or with a firm of which he is a member, or with a company in which he has a substantial financial interest.

Signed on behalf of and in accordance with a resolution of the Councillors dated 27th November 1975.

This 27th day of November, 1975

J. K. Mackenzie

J. R. Pillbrow

STATEMENT OF COUNCILLORS

We, James Kenneth Mackenzie and John Rayner Pillbrow being two Councillors of THE AUSTRALIAN INSTITUTE OF PHYSICS state that in the opinion of the Councillors –

(a) The Income and Expenditure Account is drawn up so as to give a true and fair view of the deficit of the Institute for the financial year ended 30th June, 1975, and;

(b) The Balance Sheet is drawn up so as to give a true and fair view of the state of affairs of the Institute at the end of the financial year ended 30th September 1975.

Signed on behalf of and in accordance with a resolution of the Councillors dated 27th November 1975.

This 27th day of November 1975.

J. K. Mackenzie

J. R. Pillbrow

STATEMENT OF PRINCIPAL ACCOUNTING OFFICER

I, James Kenneth Mackenzie being the principal accounting officer of THE AUSTRALIAN INSTITUTE OF PHYSICS state that, to the best of my knowledge and belief, the accounts give a true and fair view of the matters required by Section 162 of the Companies Act 1961, to be dealt with in the accounts.

Signed this 27th day of November 1975.

J. K. Mackenzie

AUDITOR’S REPORT

To: The Members of THE AUSTRALIAN INSTITUTE OF PHYSICS.

As required by the Companies Act 1961, we report as follows:

We have not acted as auditor for the following Branches or Groups:

Branches
- Australian Capital Territory
- New South Wales
- Queensland
- South Australia
- Tasmania
- Western Australia

Groups
- Biophysics
- Education
- Nuclear and Particle Physics
- Vacuum Physics
- The Australian Physicist

and report that the accounts for both the South Australian Branch and the Biophysics Group have not been audited in any way. We therefore do not accept any responsibility for the accuracy of the figures for that Branch and Group which have been used for the purposes of the preparation of the attached Balance Sheet and supporting accounts of the Institute.

Save for the above we are satisfied that the returns received from Branches and Groups are in form and content appropriate and proper for the purposes of the preparation of the attached Balance Sheet and supporting accounts of the Institute.

We have examined the Auditor’s report on the various accounts and report that such were not subject to any qualification or comment except for those of The Australian Physicist which reads as follows—

“T report that I have audited the books, records and vouchers of The Australian Physicist for the year ended 30th September, 1975 and, in my opinion, the attached Balance Sheet and Accounts are properly drawn up in accordance with those records and give a true and fair view of the state of affairs and the result for the year ended 30th September 1975.

No attempt has been made to verify subscriptions in advance as no proper records have been kept. All subscriptions received during the year have been taken as income in the year.”

Subject to the reservations as stated above

In our opinion:

(a) The attached accounts are properly drawn up –

(i) so as to give a true and fair view of the matters required by Section 162 to be dealt with in the accounts, and;

(ii) in accordance with the provisions of that Act.

(b) The accounting and other records and the registers, required by the Act to be kept by the Institute have been properly kept in accordance with the provisions of the Act.

Dated at Melbourne, this 27th November, 1975.

HARRISON LOVE & VANCE
Chartered Accountants

R. W. VANCE
Partner
5.2 Turbomolecular Pumps

TURBOVAC 450 Turbomolecular Pump

Some of its special features are:
- Single push-button operation
- Fast cycle times due to large operating range
- Highest pumping speed of all turbomolecular pumps of comparable size
- Compact — can be carried by one person
- Silent running and free of vibration
- Practically maintenance-free, low operating costs
- Flanges directly onto vacuum system
- Insensitive to accidental air admission
- Easy to clean
- Reliable due to low rotational speed and long bearing life

1.3 Rotary Vane Pumps

D 4 A -trivac- Rotary Vane Pump

-trivac- Rotary Vane Vacuum Pumps

two-stage

Building block flexibility of the mechanical assembly technique applied to the design of all -trivac- pumps allows a wide range of pump models, carefully stepped in sizes and pumping speeds to allow every customer to select the right pump for his particular application. Two-stage -trivac- pumps produce high pumping speeds even at low intake pressures and are, therefore, preferably used for operating pressures down to $10^{-3}$ mbar.

- Compact construction, handy
- No oil suck-back
- Extremely quiet operation
- Long periods between servicing
- Easy to service

Technical Data
Nominal pumping speed
(by PNEUROP Standards) $m^3/h$ 3.2 – 76
Ultimate partial pressure without gas ballast $mbar$ $< 2.5 \times 10^{-4}$
Water vapour tolerance
(by PNEUROP Standards) $mbar$ up to 40

2.2 Rotary Piston Pumps

DK 200 Monoblock Pump

Monoblock Pumps DK Models

two-stage vacuum pumps

Series DK monoblock pumps are two-stage oil-sealed rotary piston pumps for low ultimate pressures. To attain the lowest ultimate pressure, the pumps’ own oil supply feeds degassed oil to the high-vacuum stage. Due to these features, DK monoblock pumps are suitable for use in all chemical and metallurgical vacuum processes, and also in the electrical industry, at pressures down to $10^{-4}$ mbar without gas ballast or to $2.5 \times 10^{-3}$ mbar with gas ballast.

- Good ultimate vacua with or without gas ballast
- High pumping speed even at low intake pressures
- Mechanical assembly technique with standardized parts
- Air cooling

Technical Data
Nominal pumping speed
(by PNEUROP Standards) $m^3/h$ DK 100 115 DK 200 225
Ultimate partial pressure without gas ballast $mbar$ approx. $< 1.5 \times 10^{-4}$
Water vapour tolerance $mbar$ 33 26

FOR ALL YOUR VACUUM NEEDS CONTACT:
LEYBOLD—HERAEUS (AUST) PTY LTD.
251 CONDAMINE STREET, BALGOWLAH, NSW 2093
CORRESPONDENCE ADDRESS:
P.O. BOX 22 BALGOWLAH, NSW 2093 — TELEX 274966