Contents:

Vol. 8, number 4
APRIL 1971

Is a PhD of any Value?—B. M. Spicer 51
Few Shortages of Graduates 53
Eighth Annual General Meeting 54
AIP Eighth Annual Report and Financial Statement 1970 56
Book Reviews 55, 63
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An Article on matters of interest to physicists, including selected lectures given at Institute, Branch or Group meetings.
A Letter to the Editor on matters affecting physicists or on articles and letters previously published. In general, letters should not exceed 1000 words.
Notes and News may include Institute activities, announcements to members, comments and announcements by overseas Institutes of Physics and other local scientific bodies. In general, the text should not exceed 400 words. Abbreviated notices of meetings may be submitted for The Calendar.

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The original typescript and one copy should be forwarded. Original drawings should be submitted, where possible, photographic copies, Xerox, or blueprints of the originals should also be submitted. Half-tone illustrations should only be included if essential; they should be on white glossy paper and show a full range of tones with good contrast.


References are to be cited in the text by year of publication, e.g., Brosel (1947), and are to be arranged alphabetically at the end of the article, giving author's name and initials, followed by year of publication. For journal articles, this is followed by the title of periodical, volume, and page, thus:

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Advertising space instructions and/or copy should be forwarded to the Advertising Manager.

Annual Subscription:

For non-members, the subscription to *The Australian Physicist* is $5.60 per annum; single issues are 50 cents per copy. Subscription requests should be sent to the Editor.

$3.00 is transferred to *The Australian Physicist* account from the annual membership subscription received for each financial Member, Student and Subscriber of the Institute, to whom *The Australian Physicist* is issued. Copies so issued are intended solely for the recipient's personal use.

*The Australian Physicist, April 1971* 49
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IS A PhD OF ANY VALUE?

B. M. Spicer
Department of Physics, University of Melbourne

The following is an address given by Professor Spicer to the Standing Committee of Convocation, University of Melbourne. The address was published in the University of Melbourne Gazette, November 1970, to which acknowledgment is made, and is reproduced here by kind permission of the Registrar. Professor Spicer is Chairman of the PhD Standing Committee of Melbourne University. While his comments apply chiefly to that University and cover all branches of science, they are of considerable interest to members of the institute.

There are a number of reasons for posing such a question as the title for this address. Perhaps the most pressing of these is the present state of employability of such people in the USA, and the expectation that the same will pertain in this country unless we learn some of the lessons thrust at us by the American situation, and learn them quickly. Indeed, there are some signs which indicate that it may already be too late.

There are two ways of answering the question posed, one from an intellectual point of view and one from a material (employability) point of view. In these contexts, the quick answers are that a PhD is always of value intellectually—the extending and developing of a person's mental powers are intrinsically good; however, one may just as truly say that a PhD is not of any real value if the eight or so years after leaving school which are spent in achieving this status mean that no position is available for him at the end of that time. In that sense, present circumstances make the answer very much 'yes and no'. Let us then look at this second aspect first, and return to join it to the first one later on.

The employability—or if you will, the result of overproduction—of PhD's in the USA was well summarized in a column in Time on 29 June last. In that column, the situation was illustrated by examples such as:

A 26-year-old PhD in physics from MIT failed to obtain a position he sought at a little known college in Ohio. There were 360 applications for the post. At the University of Massachusetts, 1000 would-be English lecturers sought 8 posts. A small west coast college received 750 enquiries about a position in its English department, even though no opening existed.

In our own country's press, we have been seeing headlines like 'PhD's Without Jobs', 'Physicists on the Way Out', and as recently as 28 August, Professor Keith Cole of La Trobe University was reported under the headline of 'Brain Drain Warning: "No Jobs Here" attack by scientists'. I know of no reason to doubt these cries of anguish; their occurrence tells us that something drastic is wrong with the system which causes them. Why are we training so many PhD's if they can't obtain positions on graduating? Without attempting to answer this question now, it should be pointed out that this same question must have been in the mind of MIT physicist Schwartz, when he suggested that all graduate school catalogues should carry the legend: 'Warning—graduate education may be hazardous to your career.'

Coupled with this we should take note of the fact that periodic criticisms of the nature of the training in a PhD course have appeared and several such are abroad at this present time. Relevant to this present discussion is a recent Carnegie Quarterly, attributed to philosopher, Professor Wolff of Columbia University. This was to the effect that 'the fiction that the doctoral dissertation must contain an original contribution to knowledge should be done away with. 'If this standard were adhered to', he said, 'a university would probably grant only two of these degrees in a decade' . This is certainly an overstatement, and is perhaps more true in philosophy than say, in chemistry. Here we need to be a little careful in defining what we mean by 'an original contribution to knowledge'.

In the light of all these apparent cross-currents, it is necessary to spend a few moments making some comments on the history of the PhD degree in this University. The comments are very probably appropriate to all other Australian universities. The first PhD of the University of Melbourne was conferred in 1948, at a time when relatively few senior University staff members held doctorates, and certainly before the great expansions of the universities' post-graduate efforts in the late fifties and sixties.

The late forties was also a time of great expansion and advance in the sciences, particularly the physical sciences. Many of these were discoveries of principle—essentially qualitative discoveries—and these provided great stimulus to research in general, and made the period an exciting one. One is not so conscious in these days of the same density of significant qualitative discoveries; it could be truly said that most of the work of the past ten years has been concerned with matters of detail. This has led to the situation in the sciences that to add significantly to knowledge, it is necessary to specialize more closely and to dig deeper. That is, in this general philosophy, PhD graduates were not discouraged at all from wanting to continue working after graduation on the same investigation as that described in their thesis. The PhD thesis topic has tended to become a 'life sentence'.

This situation was very appropriate to the years of expansion of postgraduate effort in the universities. It
enabled the universities to appoint their own new PhD's to available staff positions—a situation that was very easy to rationalize. The local applicants were of known quality, and they had known and substantial expertise in just those topics which coincided with the research interests of the appropriate departments. Indeed, they had to have! What could be better than to appoint them to these tenure positions? The continuity, and indeed the expansion, of the department's research effort in a particular area was essentially guaranteed—an important point where the reputation of a department (particularly in the sciences) is dependent on its research effort. The only slightly jarring note of this period was an occasional criticism of the inbreeding that took place.

To summarize this period, then, it is clear that the universities were able to absorb the vast majority of the PhD's produced without any need to be concerned overmuch about the requirements of the outside world, and without any need for concern as to the relevance of the research interests in the outside world. They were free to pursue knowledge for its own sake.

It must be made very clear that this is a very right and proper programme for a university to pursue; if knowledge for its own sake is not sought in the universities, where will it be sought? I do not wish to imply that universities are the only places where knowledge is sought for its own sake, but I do say that, overall, they are the largest contributor.

Because of this past history, there seems to have grown up a tradition that all a university should do is to pursue knowledge for its own sake. Our own PhD rules state that: "The degree of Doctor of Philosophy is generally held to signify that the holder has proved his capacity to think critically, to make some contribution to knowledge relating to his subject and to embark on independent research. An essential element in the PhD qualifications is the spending of a definite period in training under academic supervision."

It is very easy to read into that statement the notion that the PhD candidate shall, as a matter of policy, be involved in research whose sole purpose is the pursuit of knowledge for its own sake. It is not necessary to read this meaning into the statement however.

Let us go further and note that the fruits of the expansion of postgraduate work have come in ever increasing numbers of graduating PhD's. This University conferred:

- 12 PhD's in 1953
- 25 in 1960
- 39 in 1964
- 62 in 1967
- 74 in 1968

The total number who have qualified for the degree up to 30 June last, in this University, is 634, and one third of these have qualified in the three years 1967–8–9.

We currently have 503 candidates working for the PhD degree in the University—an increase of 25 per cent over three years ago. Of these about 150 are members of staff working part-time for the degree.

And we are still training them with the same basic philosophy as we did 20 years ago—in just the manner we discussed above—even though the employment scene has changed, and is changing drastically. It is to the credit of the University that we do recognize that we are training these people; we do not simply provide facilities and invite PhD candidates to use them with the object of getting the best solution they can manage to a problem of their own choice. The staff of the University is deeply involved in the research work that is done.

Notwithstanding this, there are currently being produced more PhD's than ever before and this at a time when the opportunities of employment within universities are very limited—even approaching zero. In the light of this, I want to suggest that we as a University have a responsibility to the community, and to the people we train to this high level. Because of this, we should be re-examining the purpose of the PhD and the type of training offered in the course for that degree. By this I do not mean that we should be attempting to match the training of each individual PhD candidate to the career he will take up on graduating. This is clearly impossible, even if only because it is impossible to predict just what the subsequent careers will be in individual cases. It is also clearly impossible for a single university department (or even collection of departments) to have within it, that is, among its staff, a sufficiently wide range of expertise to allow it to do this.

However, I do believe that we act irrationally if we do not observe the general sphere of employment of our PhD graduates and if we do not make some adjustments according to the nature of that general sphere of employment. For example, in physics the general sphere of employment was academic until quite recently, but it is now tending to shift to industrial. It is certainly true that the necessary adjustments will vary from subject to subject, and so I am in effect calling upon each department of this University to review the nature of its PhD training, and amend it if necessary.

For example, I know that industry has been exhorted—from various quarters—to employ more PhD's. So they should! But it is equally true that while these exhortations have been sounded, we have continued to provide PhD training with the emphasis on great depth and narrow specialization. That is to say, the most general requirements of the industrial laboratories have been ignored. One has only to walk around an industrial laboratory to see that the requirement there is for somewhat less depth, and for considerably greater breadth of interest.

Let us be clear that what is being called for is not less depth but rather greater breadth, and also the destruction of the notion that a PhD candidate can expect to continue working on the subject which is his thesis topic. What I have said of physics will certainly be true to a greater or lesser extent in other technical departments, but it is most obvious in the so-called "pure science" departments. I am not competent to speak of the position of those departments on the humanities side. Nonetheless, the call to re-examine the nature of our PhD training is made quite general, because over
85 per cent of our 503 present PhD candidates are working in technical departments. Indeed, one-third of them are to be found within the schools of Chemistry and Physics, and the department of Physics (RAAF Academy).

My conclusion is that we must more and more regard the PhD as training in the methods of research in his particular subject—with a specific area providing the means by which such training is achieved. We must remove the notion that the topic of work for a PhD degree must be pursued by that candidate for the rest of his life. This means, I believe, that we must to some extent de-emphasize the subject and increase substantially the idea of the research worker as a recognizer, formulator and solver of problems.

However, we must retain a balanced outlook and not let the pendulum swing too far in this matter. There is evidence, at the secondary school level, that some educators are busy trying to make courses which are approaching the 'content-free' state. That is, they are so busy trying to emphasize the methods of, for example, science, that they tend to forget that it is the subject matter of physics which makes it to be physics, of chemistry which makes it to be chemistry, and so on. We must not make this mistake with regard to PhD training.

However, if we are to act responsibly, we must have the nature of the training for this degree continually under review. Certainly, we must retain the place of the university as a seeker of knowledge for its own sake, but we must also take account of the scene for which PhD candidates are being trained, and be flexible enough in our reactions to changes in the scene that we fit our graduates in the best possible way for entering it. And we must remove the notion that PhD graduates may expect to continue working on what was their thesis topic.

Only if we do this will the PhD have its greatest value, its holders having been trained to a high level in their chosen subject and yet being broad enough in their interests that they will not suffer unnecessary frustrations in finding employment.

AND FROM SYDNEY

Graduates: Few Areas of Shortage

Outside teaching, there is no general shortage of first-degree graduates in science, arts or economics/commerce in NSW and the ACT, states the University of Sydney Appointment Board in its 35th Annual Report. The Board, quoting from its latest survey of employer opinion, conducted to provide guidelines to the demand/supply position for different types of graduates, says the 1970 findings confirm those reported in 1969, and this in spite of the impact of the Wyndham Scheme, which resulted in substantially smaller numbers of arts and science graduates in 1970.

There is, however, a shortage of most types of graduates from the Professional Schools (dentistry, engineering, medicine, veterinary science, etc.) which, the Board says, 'looks like continuing indefinitely'. It goes on to say: 'The reasons for this are not difficult to find; on the one hand, demand is increasing whilst, on the other (mainly because of quotas) supply is stable or, at best, increasing only slowly'.

For graduates of some disciplines in science, the outlook has worsened. Chemists, for whom the demand and supply has been about in balance heretofore, are now shown to be in over-supply rather than in a few specialized areas of work; a similar situation prevails for microbiologists and bacteriologists. The demand continues to be heavy for geologists and geophysicists, whereas that for physicists is minimal compared with the supply of physics 'majors'.

The Board agrees with other authorities' recent forecasts that a surplus of higher-degree graduates in some science disciplines could soon develop both locally and overseas. It attributes this to a cutback in research funds in the United States and a levelling off in Australian demand due to slower rates of growth in universities and government research organizations.

The continuing shortage of economics/commerce graduates who are numerate (that is, with a substantial statistical/mathematical content in their courses) is singled out for comment. 'A minor tragedy of the space race syndrome', said one employer, 'has been the diversion of a proportion of people who could have made excellent mathematical economists to a recently glutted buyers' market for physicists'. Still persistent also is the demand for economics/commerce graduates with accounting majors; indeed, says the Report, it would appear that the demand for this type of graduate is 'virtually insatiable'.

Nevertheless, the employment prospect overall, when teaching positions are also taken into account, is much brighter for science and economics/commerce graduates (with both first and higher degrees) than it is for arts graduates. In the case of science graduates, the Board says that 'total demand will exceed total supply for some years to come' provided those who can't get other jobs are prepared to teach.

The outlook for the arts graduate is expected to deteriorate. The Board has revised its earlier estimates of graduate supply in the light of recent figures available from the Australian Universities Commission and concludes that teaching, the largest employment area for arts graduates, will be unable to absorb the projected increase in arts graduate numbers to 1976. 'One thousand arts graduates would have to find other employment (i.e., non-teaching employment) each year over the next five years, compared to an estimated 600 who found other employment each year over the last five. It is the Board's view that "other demand" of this sort of magnitude does not and will not exist'.
AUSTRALIAN INSTITUTE OF PHYSICS (Incorporated in Victoria)

EIGHTH ANNUAL GENERAL MEETING

UNCONFIRMED MINUTES

Minutes of the Eighth Annual General Meeting of the Australian Institute of Physics, held in the Department of Physics, University of New England, Armidale, New South Wales, at 4.00 pm on Thursday, 11 February 1971.

1. Attendance.

1.1 Present


1.2 Apologies and Proxies

Apologies were received from Professor R. Street, Dr F. J. Jacks, Dr R. D. B. Fraser and Dr W. Boas. No proxy was appointed.

2. Seventh Annual General Meeting

2.1 Minutes

The Minutes were amended to add the name of Mrs J. R. Makinson to the list of those from whom apologies had been received.

Resolved that the Minutes of the Seventh Annual General Meeting held at the School of Physics, University of New South Wales, on 20 January 1970, as published in 'The Australian Physicist' but with the above amendment, be taken as read and confirmed.

2.2 Business Arising from Minutes

The President stated that following the motion relating to equal pay for women physicists the Council had reconsidered the matter, but decided that the time had passed when effective action could be taken. The lesson learned was that on future occasions action must be taken more promptly.

3. Eighth Annual Report

In moving the adoption of the Annual Report, the President reviewed a number of aspects of the year's operations. On the financial side, he drew attention to the undrawn portions of Branch and Group grants, which were not good insofar as they represented lack of activity. The office in Clunies Ross House was now shared by three societies, with larger total staff and hence smoother operation.

The President said that once again he must pay a tribute to the work done by the Editor of 'The Australian Physicist', Dr J. L. Symonds, and the Assistant Editor, Dr W. H. Steel. During 1970, since new printers took over the job, the publication had been brought back on to the monthly schedule. However a steep rise in printing charges had occurred at the end of the year, so that ways must be found to compensate. He appealed to all those in a position to influence placement of advertisements for physicists' position to use this journal.

During the year the position of Groups within the Institute had received particular consideration by the Council. The Biophysics and Vacuum Physics Groups were working well, holding successful national gatherings. However the Education Group tended to operate independently in different States, and its activities could perhaps be undertaken better by Branches. The Geophysics Group was also suffering from lack of coherence, due to the diverse interests which came under the general ambit of geophysics.

The Benevolent Fund continued to be well supported, and was in a position to act in the future when required. The President asked anyone knowing of a case deserving such consideration to bring it to the notice of his Branch Chairman. In conclusion the President thanked those who had represented the Institute on other bodies, and also the office-bearers of the Branches and Groups and the members of the Institute's committees, for their work during the year. He expressed particular appreciation of the work of the Honorary Treasurer, Dr J. K. Mackenzie, the Honorary Secretary, Dr J. G. Campbell and the Honorary Treasurer, Dr R. D. B. Fraser, and paid tribute to the unstinting service of the staff led by the Assistant Secretary, Mrs J. A. Mackenzie.

In the discussion that followed, Dr White referred to Item 6.4, third paragraph of The Low Temperature Conference in Japan had followed, not preceded, the Conference on Transport Properties of Solids, and the Report should be amended accordingly.

Dr Dalton queried progress on the investigation into the training and employment of physicists being initiated by the New South Wales Branch. Dr Macfarlane replied that though the draft questionnaire had been referred to other Branches for comment some months ago, no replies had yet been received.

Dr White raised the question whether monthly meetings were still an appropriate activity for Branches and mentioned that the Victorian Branch had abandoned them altogether. Dr Aitchison said that while the ACT Branch continued to hold evening meetings these were no longer on a regular fixed schedule. Dr White also asked whether the central office could assist in the organization of conferences. The President replied that there was little it could do in organizing particular conferences due to geographical difficulties, but it could possibly collect and disseminate general information on how to run good conferences.

Dr Makinson asked whether AIP membership was of value in setting salary levels. The President replied that it was of value indirectly, in that, for many government positions, eligibility for AIP membership was taken as a criterion. The Institute had evaluated a great many overseas physicists' qualifications from this point of view at the request of government departments. Dr Campbell added that so far as industry was concerned the body which negotiated salary levels for physicists was the Association of Professional Scientists of Australia.

Mr Boundy asked whether outlying Branches could be given advance information of prominent physicists visiting their areas. Dr Dryden said that this could best be done by publicising forthcoming visits in the 'Notes and News' column of 'The Australian Physicist'.

Resolved that the Eighth Annual Report, with the reference to the Low Temperature Conference amended in accordance with Dr White's comment, be adopted.

4. Eighth Annual Financial Statements

The Honorary Treasurer, Dr J. K. Mackenzie, in moving the adoption of the Statements, explained their different format from previous years. One set of statements covered
only Council-controlled funds, and another set showed the consolidated position for the Institute as a whole including Branches and Groups. The consolidated income and expenditure statement conformed to the minimum requirements of company law, but members of each Branch and Group should receive a separate set of their own audited accounts for that Branch or Group. Separate statements were provided for the Benevolent Fund and for 'The Australian Physicist', neither of which were included in the consolidated accounts, and there was also a statement of the reserve funds.

Dr Mackenzie pointed out the summarized expenditure statement in the Eighth Annual Report, which showed that the cost of operating the office (salaries, rent and cleaning) amounted to 18 per cent of the total expenditure. This indicated the extent of the 'hidden subsidy' from employers of voluntary office-bearers prior to the establishment of the office.

Dr Atchison asked why Branch and Group grants were less than in the previous year. The President explained that the accounting period for Branches and Groups had been only nine months, to bring them into line with the Council's financial year, and so they had received only 90 per cent of their normal annual grants. To allow for a possible future return to the previous accounting period, $400 had been credited to a special reserve fund.

Resolved that the Eighth Annual Financial Statements be adopted.

5. Appointment of Auditor

Resolved that Gordon Quinn and Company of 325 Collins Street, Melbourne, be appointed Auditors for 1971.

6. Declaration of Election of Executive

The President reported the result of the election of the new Executive, to take office from the conclusion of the meeting, as follows:

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

Dr Dryden then moved a vote of thanks to the retiring President, Mr Harper. He said the Institute was enormously indebted to Mr Harper for his contribution over a long period, in the early discussions which led to the separation from the Institute in London, in the formation of the AIP, in his long period as Honorary Secretary, and in his term as Vice-President and then as President. This motion was carried with acclamation.

The Meeting closed at 4.15 pm.

BOOK REVIEW

PHYSICS DEMONSTRATION EXPERIMENTS (Volumes I and II), H. Meiners, (ed.). Ronald Press, New York, 1970. (Approx. $35.00.)

Reviewed by E. R. Sanderson, Bedford Park Teachers College (on leave at Rensselaer Polytechnic Institute, Troy, New York).

These two volumes of physics demonstrations, occupying some 1400 pages, are the result of several years work of an AAPT committee, co-directed by H. Meiners and R. Resnick. The mammoth task of editing the material was undertaken by Meiners. The final result of this task is the publication of two superbly printed volumes. From the coloured frontispiece of Sir Lawrence Bragg presenting a lecture-demonstration at the Royal Society to the comprehensive lists of equipment manufacturers, the volumes command the reader's attention. The photographs of demonstration equipment are presented with exceptional clarity, while the diagrams and sketches are well annotated and complement the description of the demonstrations. Physics educators who use physics demonstrations will discover that the two volumes are long-awaited supplements to Sutton's book of physics demonstrations.

The editor and the committee are to be commended on their foresight of including demonstration philosophy and techniques as well as the many demonstrations. Volume I contains articles on the purpose and uses of lecture demonstrations, while Volume II discusses techniques such as closed-circuit TV, films as a lecture aid, corridor demonstrations, the use of the overhead projector, and stroboscopic effects. In addition Volume I contains articles on lecture demonstrations in England (Sir Lawrence Bragg), shadow projection (R. W. Pohl), and discussions on demonstrations by E. M. Rogers and G. R. Holton.

The demonstrations are listed under the traditional physics areas. Volume I contains demonstrations on Mechanics, Wave Motion, while Volume II lists Heat, Electricity and Magnetism, Optics, and Atomic and Nuclear Physics. Both volumes contain constructional details and materials lists for the demonstrations, other reference sources to demonstrations, a list of contributors, and a list of equipment manufacturers.

With students demanding relevance in their studies and some physics educators attempting to present physics in an interesting way to both science and non-science students, there is a trend to present the great ideas of physics rather than continue to narrow, problem-solving approach. The ideas of physics can be brought out most effectively to beginning students by presenting the phenomena of physics, an exciting and highly motivating aspect of the discipline. As phenomena are usually presented best by demonstration or student investigation, these volumes will be of great benefit to the physics educator, who desires to present physics by using the phenomenological approach. While the volumes may seem expensive, their usefulness to the physics educator, devoted to motivating his/her students, outweighs the expense. The purchase of these volumes by the 'chalk and talk' physics teachers may help them see the errors of their approach. Thus I strongly recommend that physics educators at both secondary and tertiary level add to their libraries these excellent volumes of physics demonstrations and how to present them.
EIGHTH ANNUAL REPORT, 1970

1. General

During 1970 the Institute continued to progress along the lines previously established.

Membership increased more slowly than in earlier years. Corporate membership increased by 7 per cent. to 1267 and overall membership by 4 per cent. to 1560. Company Subscription decreased by 32.

Mr K. C. Lang, Emeritus Professor H. C. Webster and Sir Frederick White were elected Honorary Fellows of the Institute during 1970, bringing the total in this category to five.

Financially the Institute recorded a surplus of $2939, of which $1400 has been set aside in contingency reserve accounts. The office in Clunies Ross House, previously shared by the AIP and The Australian Institute of Refrigeration Air Conditioning and Heating (AIRAH), admitted a third equal partner, the world secretariat of the Solar Energy Society.

2. Finance

The accounts for the year ended 30 September 1970 presented herewith are in a slightly different form from that used last year. Members should have received separate financial statements from the Branches and Groups to which they belong. The Australian Physicists' accounts and those for the funds under the direct control of Council are now also presented separately.

Significant contributions to the consolidated surplus of $2929 arise from undrawn grants to Branches and Groups of $1790 and a surplus of $409 from the Vacuum Physics Group Symposium.

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

<table>
<thead>
<tr>
<th></th>
<th>1969</th>
<th>1970</th>
</tr>
</thead>
<tbody>
<tr>
<td>35% Branch and Group Activities</td>
<td>28%</td>
<td>5148</td>
</tr>
<tr>
<td>25% 'The Australian Physicist'</td>
<td>28%</td>
<td>5000</td>
</tr>
<tr>
<td>35% Administration—office</td>
<td>18%</td>
<td>3300</td>
</tr>
<tr>
<td>other</td>
<td>8%</td>
<td>1414</td>
</tr>
<tr>
<td>5% Council Meetings</td>
<td>3%</td>
<td>597</td>
</tr>
<tr>
<td>Increased Accumulated Funds</td>
<td>15%</td>
<td>2691</td>
</tr>
</tbody>
</table>

$18150

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

Although the budget for 1970 for Council Funds expected a deficit of $660, a surplus of $2083 resulted. Subscription income was higher than expected and administrative costs, particularly for printing, were lower. In 1969 printing costs of $2496 were incurred by periodically-recurrent printing of the membership list, application forms and General Information booklets, whereas in 1970 printing costs were only $731. To offset such fluctuations a sum of $1000 has been allocated to a special reserve fund for printing.

The financial year for Branches and Groups was adjusted in 1970 to bring it into line with the Institute's financial year. Allocations to the Branches and Groups for the nine months ended 30 September 1970 were 90 per cent. of a full year's grants, 10 per cent. ($400) being transferred to a special reserve fund against the contingency of a possible reversion to a January–December financial year. This accounts in part for a reduced disbursement for Branch and Group activities. However this was somewhat offset by the withdrawal of $850 by the Branches and Groups from their Reserve Funds.

Admission of the Solar Energy Society as a third partner in the office resulted in a saving for the existing partners on shared administrative costs, the cost to the AIP for rent, cleaning and salaries being $3300.

For 1971 it is expected that expenditure on Council Meetings and staff will increase. The Australian Physicist will cost more to distribute because of increases in postal charges; Council Meetings will cost more because of the decision to return to two financially-supported meetings per year. These increases will be offset in part by increased income, and a deficit of $700 has been budgeted.

It will be noted that the investment in Associated Securities Limited has been increased to $3000 and now earns interest at the rate of 8% per cent. (previously 7% per cent.) p.a. A new investment with a face value of $3000 in BP debentures (cost $2753) will yield approximately 8% per cent. p.a. if held to maturity. Collectively investments amount to $15,000, of which $10,437 is held on behalf of Branches and Groups. They are so arranged that $2000–$3000 matures annually.

3. Membership

The Institute records with regret the deaths of Mr R. T. W. Bingham (Fellow), Dr D. F. Martyn (Fellow), Dr K. M. Burrows (Associate), Mr L. Gare (Graduate) and Mr W. H. Roberts (Subscriber).

---

**TABLE I—REGISTER AS AT 31 DECEMBER 1970**

<table>
<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>
</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>
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<tr>
<td>Fellow</td>
<td>11</td>
<td>55</td>
<td>11</td>
<td>17</td>
<td>4</td>
<td>60</td>
<td>8</td>
<td>11</td>
<td>180</td>
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<tr>
<td>Associate</td>
<td>34</td>
<td>143</td>
<td>47</td>
<td>51</td>
<td>4</td>
<td>139</td>
<td>38</td>
<td>40</td>
<td>500</td>
</tr>
<tr>
<td>Graduate</td>
<td>43</td>
<td>160</td>
<td>40</td>
<td>93</td>
<td>7</td>
<td>138</td>
<td>32</td>
<td>59</td>
<td>582</td>
</tr>
<tr>
<td>Total Members</td>
<td>90</td>
<td>359</td>
<td>98</td>
<td>163</td>
<td>15</td>
<td>338</td>
<td>79</td>
<td>111</td>
<td>1267</td>
</tr>
<tr>
<td>Student</td>
<td>5</td>
<td>64</td>
<td>13</td>
<td>29</td>
<td>1</td>
<td>36</td>
<td>17</td>
<td>6</td>
<td>182</td>
</tr>
<tr>
<td>Subscriber</td>
<td>15</td>
<td>30</td>
<td>3</td>
<td>18</td>
<td>2</td>
<td>28</td>
<td>10</td>
<td>4</td>
<td>111</td>
</tr>
<tr>
<td>GRAND TOTAL</td>
<td>110</td>
<td>453</td>
<td>114</td>
<td>210</td>
<td>18</td>
<td>402</td>
<td>106</td>
<td>121</td>
<td>1560</td>
</tr>
<tr>
<td>Company</td>
<td>12</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>13</td>
<td>2</td>
<td></td>
<td>32</td>
</tr>
</tbody>
</table>

*Overseas †Whereabouts Unknown

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56 The Australian Physicist, April 1971
### TABLE II—CHANGES IN REGISTER DURING 1970

<table>
<thead>
<tr>
<th>Grade</th>
<th>Gains</th>
<th>Transferred</th>
<th>Losses</th>
<th>Net Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New</td>
<td>To</td>
<td>From</td>
<td>Deceased</td>
</tr>
<tr>
<td>Hon. Fellow</td>
<td>3</td>
<td>3</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Fellow</td>
<td>6</td>
<td>5</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Associate</td>
<td>28</td>
<td>45</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Graduate</td>
<td>48</td>
<td>42</td>
<td>44</td>
<td>1</td>
</tr>
<tr>
<td>Total Members</td>
<td>82</td>
<td>95</td>
<td>52</td>
<td>4</td>
</tr>
<tr>
<td>Student</td>
<td>51</td>
<td>1</td>
<td>41</td>
<td>12</td>
</tr>
<tr>
<td>Subscriber</td>
<td>11</td>
<td>3</td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>GRAND TOTAL</td>
<td>144</td>
<td>96</td>
<td>96</td>
<td>5</td>
</tr>
</tbody>
</table>

The membership figures at the end of 1970, and the changes during the year, are given in Tables I and II respectively. Recruitment at all levels was less than in 1969 but transfers from Student to Graduate and Graduate to Associate were greater. The decline in the number of Subscribers continues, mainly through resignation.

The drive to recruit student members introduced in 1969 was repeated in 1970 and excellent co-operation was obtained from all the universities and institutes which award tertiary qualifications in physics. The number of students recruited during 1970 was 51 compared with 62 in 1969.

Membership of the Groups was: Biophysics 85, an increase of 8; Geophysics 190, unchanged; Education 147, unchanged; and Vacuum Physics 145, an increase of 6.

It is to be regretted that the names of 16 members, 13 Students and 4 Subscribers had to be removed from the Register during 1970 for non-payment of subscriptions.

On 16 July the President and Hon. Registrar met members of a committee appointed by the Commonwealth Government to deal with the recognition in Australia of overseas qualifications (Committee on Overseas Professional Qualifications). The Committee plans to publish a series of booklets on this topic and Council has agreed the Institute would collaborate with the Committee in preparing a booklet on the profession of physics.

### 4. Office

In June the full-time staff of the office was increased to two, plus one half-time employee, in order to cope with an increasing volume of work. In July the world secretariat of the Solar Energy Society was admitted as a third, equal partner with AIP and AIRAH. This proved of financial benefit to the original partners in offsetting the increased cost of salaries. Provision has been made for a second part-time employee in the budget for 1971 to cover the expected increase in the workload as the SES assumes its share of the office time.

During the year a number of outstanding projects were finalized and efforts to increase the efficiency of the office systems continued.

The formation of the Clunies Ross House Services Committee is expected to promote co-operation between the many societies with offices in the building, particularly in regard to sharing of office equipment.

### 5. 'The Australian Physicist'

The Editorial Committee has had the benefit of a stable arrangement during 1970 with its new printers, Simmons Limited. They not only returned the journal to schedule within the first three months of their operation but also provided a service which has been welcomed by the editorial staff. The return to normality in printing schedules has seen a corresponding return of some advertising, particularly of vacant position advertising. The increases in printing and postal costs have been offset by the increase in advertising rates to the extent that expenditure has been held within the allocated budget. (It should be noted that 13 issues were printed within the last 12-month period.)

An extensive review of information on distribution and reader categories led to the production of information sheets for potential advertisers. The result is only just being felt and it is hoped that the increased interest in advertising will grow. Copies of the document can be made available to members who feel that they may be able to assist in promoting the journal with potential advertisers.

Some difficulties have been experienced in keeping up the flow of articles of interest, particularly during the latter part of 1970. The Editorial Committee is reviewing other types of material which could be published and would welcome any suggestions from members (particularly if papers are offered as well). The assistance of Branch Correspondents is vital in making it possible to publish news of Branch activities. The national character of the journal can only be maintained with the active support of the Branches, the Groups and the members.

### 6. Institute, Branch, and Group Activities

#### 6.1 General Meeting

The Seventh Annual General Meeting of the Institute was held at the University of New South Wales on 20 January 1970. The President was in the Chair and 45 other members were present. The unconfirmed Minutes of this Meeting were published in 'The Australian Physicist' in March 1970.

#### 6.2 Council and Executive Meetings

Two Council Meetings, each lasting two days, were held in May and October. Six Executive Meetings were held during the year.

As an economy measure, Council made no funds available to support attendance at the 16th Council Meeting in May. At the following Meeting in October, it was decided that attendance of Councillors should be supported at meetings per year, and of Group Chairmen at one Meeting.

The financially supported attendance of Group representatives at the whole of the October Meeting was a new feature and a special discussion was held on the function of Groups within the Institute.

#### 6.3 Pawsey Memorial Lecture

The Sixth Pawsey Memorial Lecture in honour of the late Dr J. L. Pawsey was delivered by Dr C. H. B. Priestley, Chief of CSIRO Division of Meteorological Physics, at Clunies Ross House, Melbourne, on 13 October 1970. The lecture was entitled 'The Physical and Micro-Environment of Life on Earth' and was well attended. A dinner was held beforehand for members and invited guests.

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*The Australian Physicist, April 1971*
6.4 Summer Schools and Conferences

The Queensland Branch organized a Joint Conference with the Astronomical Society of Australia in Brisbane from 24 to 29 May. The timing of this Conference precluded the holding of an associated summer school. Professor J. T. Jeffries of Hawaii was guest lecturer and the overall attendance was approximately 100. Papers from the Conference are to be published in the Proceedings of the Astronomical Society of Australia.

An International Conference on the Geophysics of the Earth and the Oceans, organized by the NSW Branch, was held at the University of New South Wales from 19 to 23 January 1970. With an attendance of 430 it was the largest Conference ever sponsored by the Institute. Nine invited papers and 58 shorter papers were presented. The attendance of seven speakers from England, Canada and USA was assisted financially through the generosity of 13 private firms and the NSW Department of Mines, and by an associated exhibition of books and equipment. A special issue of the journal 'Geophysical Research' will publish the invited papers and abstracts of contributed papers. As an outcome of the Conference, an Australian Chapter of the Society of Exploration Geophysicists may be set up and the intermingling of workers from industry and the universities was a valuable feature. Considerable support for a continuing series was expressed.

A second international conference on Transport Properties of Solids was organized by the NSW Branch during the year. This was held at the University of Sydney from 27 to 29 August 1970. It was supported by the International Union of Pure and Applied Physics, the Australian Academy of Science, the CSIRO National Standards Laboratory, the Commonwealth Government and industrial organizations. Almost a quarter of the attendance of 100 was from overseas. A number of the participants attended the 12th International Conference on Low-Temperature Physics in Japan immediately following this Conference. The papers presented were interesting and stimulating and it was felt by the participants that studies in this field will prove of major interest for a long time to come.

The Einstein Memorial Lecture was once again organized by the SA Branch. Dr A. L. G. Rees, Chief of CSIRO Division of Chemical Physics, delivered the lecture on 'The Origins of Modern Technology' on 14 October in the Horace Lamb Theatre at the University of Adelaide.

6.5 Biophysics Group

The 10th Annual Conference on Physics in Medicine and Biology was held from 24 to 28 August at Clunies Ross House, Melbourne. The Conference was attended by 101 delegates and a wide range of biophysical subjects was covered. The attendance of speakers was financially supported and a scientific trade exhibition was held in conjunction with the Conference. During the Conference a meeting of societies sharing biophysical interests agreed to develop a liaison. The quarterly Bulletin, published jointly with the Hospital Physicists' Association, continues to keep members informed.

6.6 Geophysicist Group

Apart from participation in the Conference on Geophysics of the Earth and the Oceans organized by the NSW Branch, and completion of the Stable Auroral Red Arcs project, there was little combined activity within the Group during the year. The Group's activities and interests have changed since its formation and its members are being asked to consider whether it should expand its activities into new areas.

6.7 Education Group

The NSW and SA Sections of the Education Group continued their activity in the new Senior School Physics courses in both States and publication of physics texts for students. The WA Section disbanding during the year and the interests of its members will be served by the Branch in that State. Members in NSW and SA have been asked to consider whether the Group should continue or whether educational matters should become a responsibility of the Branches.

6.8 Vacuum Physics Group

The Second National Symposium and Exhibition was held at the University of Sydney from 24 to 26 August 1970. Contributions from a wide section of the vacuum field and an overseas guest lecturer will be published in the Journal 'Vacuum'. The associated exhibition included ten commercial stands and one on instruments in development. Members are kept informed by a double-page Newsletter published quarterly in 'The Australian Physicist'.

6.9 Training and Employment of Physicists

The NSW Branch submitted a proposal to the 17th Council Meeting embracing the collection and collation of data supplementary to the Survey conducted by the Department of Labour and National Service in 1966. The need for a continuing study has been accepted by Council as a major responsibility to members, and other Branches have been invited to contribute financially to the investigation proposed by the NSW Branch. A brief report on the Department's Survey was published in the January 1970 issue of 'The Australian Physicist', but the full report of the Survey is not yet available.

6.10 Co-operation with Overseas Physicists' Organizations

A reciprocal arrangement with the French Physical Society, similar to existing arrangements with other overseas physicists' organizations, was adopted during the year.

6.11 Benevolent Fund

Contributions of members to the Benevolent Fund are gratefully acknowledged; one payment was made during the year, and the Fund stood at $2886 at 30 September 1970.

6.12 Co-operation with other Scientific and Technological Organizations

A conference of Allied Societies was formed during the year as a result of meetings in Sydney by representatives of The Institution of Engineers, Australia, the Australasian Institute of Mining and Metallurgy, the Royal Australian Chemical Institute and the Australian Institute of Physics, to promote discussion and exchange of ideas on matters of common interest.

A more widespread grouping of scientific and technological societies was discussed at meetings in Clunies Ross House in May and November. The proposal to form an organization to be known as SCITEC Australia (a name coined by a similar Canadian organization) has been referred to all the societies accredited to the Clunies Ross Foundation, for consideration during 1971.

6.13 Amendment of By-Law

By-Law 43 (2) was amended to increase the period for which Branch Committee members may hold office from four to eight years, as this By-Law had previously tended to prevent experienced Committee members from becoming Chairmen of Branches.

7. Membership of Council for 1970

The following members of the Executive took office in February 1969 and complete their term at the conclusion of the Eighth Annual General meeting in 1971:

President: Mr A. P. A. Harper
Vice-President: Professor R. Streat
Hon registrar: Dr R. D. B. Fraser
Hon Treasurer: Dr J. K. Mackenzie
Hon Secretary: Dr J. G. Campbell
Dr A. Walsh 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 1970 as follows:

Dr G. J. Aitchison: ACT Branch
Professor B. P. George: NSW Branch
Professor D. Muggleton: Qld Branch
Dr F. J. Jacka: SA Branch
Dr A. G. Fenton (acting): Tas. Branch
Dr J. L. Farrands: Vic. Branch

The Australian Physicist, April 1971
8. Officers of the Institute

Secretary: Dr J. G. Campbell
Assistant: Mrs J. A. Mackenzie

Editorial Committee: "The Australian Physicist"

Dr J. L. Symonds: Editor
Dr W. H. Steel: Assistant Editor
Mr J. T. O'Mara: Advertising Manager
Mr G. A. Bell: Book Review Editor
Mr A. F. A. Harper
Dr J. S. Dryden

Auditor: Gordon Quinn & Company

Trustees for the Institute:
Dr R. D. B. Fraser Dr A. C. Hurley
Mr J. J. McNeill Mr T. P. MacRae
Professor R. Street

Trustees for the Benevolent Fund:
Dr J. K. Mackenzie: Chairman (ex officio)
Mr A. Walsh Mr A. F. A. Harper
Dr J. G. Campbell Mr F. J. Lehaney (from 4.8.70)
Professor H. C. Webster (to 4.8.70)

Returning Officer: Professor B. M. Spicer

Membership Committee:
Dr R. D. B. Fraser: Chairman (ex officio)
Mr K. H. Clarke Dr J. L. Rouse
Mr A. F. A. Harper (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

ACT Branch
Chairman: Dr G. J. Aitchison
Vice-Chairman: Mr J. C. Dooley
Hon. Secretary-Treasurer: Mr D. C. Creagh
Dr R. W. Crompton, Mr R. W. N. Kincair, Mr K. C. Lang,
Dr R. J. MacDonald, Dr J. R. Philip, Mrs E. M. Richardson

NSW Branch
Chairman: Professor E. P. George
Vice-Chairman: Professor C. D. Ellyett
Hon. Secretary: Dr J. C. Macfarlane
Hon. Treasurer: Mr J. V. McAllan
Mr E. G. Thwaite, Dr B. H. J. McKellar, Mr G. C. Fletcher,
Mr T. N. Sabine, Mr K. R. Powell, Professor N. H. Fletcher,
Mr A. I. Segal

Qld Branch
Chairman: Professor D. Mugglestone
Vice-Chairman: Dr O. J. Wordsworth
Hon. Secretary-Treasurer: Dr P. E. Monro

SA Branch
Chairman: Dr F. J. Jacka
Vice-Chairman: Mr E. R. Johnson
Hon. Secretary (to Oct.): Dr B. H. Horton
(from Oct.): Mr W. S. Boundy
Hon. Treasurer: Dr R. D. Campbell
Dr H. A. Blewitt, Mr W. S. Boundy, Mr E. H. Hirsch,
Mr C. V. Laiz, Dr A. F. Nicholson

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

Vic. Branch
Chairman: Dr J. L. Farrands
Vice-Chairman: Dr A. J. Dyer
Hon. Secretary: Mr J. V. Sullivan
Hon. Treasurer: Dr J. L. Rouie
Professor D. H. Morton, Mr A. K. Connor, Mr R. J. de
Groot, Dr J. F. G. Darby, Mr D. L. Swingler, Dr G. V. H.
Wilson, Dr J. Liesegang

WA Branch
Chairman (to 7.5.70): Dr E. N. Maslen
(from 7.5.70): Dr J. Graham
Vice-Chairman (to 7.5.70): Dr J. Graham
(from 7.5.70): Dr F. N. Maslen
Hon. Secretary-Treasurer: Mr B. W. Thomas
Dr R. S. Crisp, Dr S. E. Williams, Mr R. F. Fleay, Mr R. E.
Price, Mr B. King, Mr D. W. K. Collins, Mr D. Sampey,
Dr K. W. Terry, Dr B. H. O'Conner

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

Geophysics Group
Chairman: Dr A. J. Dyer
Vice-Chairman: Dr J. A. Thomas
Hon. Secretary-Treasurer: Mr B. B. Hicks
(acting from May): Mr P. D. Berwick
Mr G. O'Mahony, Dr L. Thomas, Professor R. Green,
Professor D. M. Boyd, Dr E. J. Polsk, Dr J. F. G. Darby,
Dr F. D. Stacey, Mr S. Gunson

Education Group
Chairman: Mr A. W. Pybus
Hon. Secretary-Treasurer: Mr C. V. Latz
Mr R. S. Caddy, Dr J. D. Whitehead, Dr G. J. Aitchison,
Dr. K. W. Terry

Vacuum Physics Group
Chairman: Mr J. D. Mellor
Vice-Chairman: Mr W. R. G. Kemp
Hon. Secretary: Dr J. W. Kelly
Hon. Treasurer: Mr F. Ross Sellenger
Dr W. I. B. Smith, Dr J. A. Ramsey

10. Council for 1971

Council for 1971 will comprise the Executive, elected to
take office at the Eighth Annual General Meeting, the Im-
mediate Past President (Mr A. F. A. Harper) and the Branch
Chairmen (see Section 11 below).

Nominations for 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


ACT Branch
Chairman: Mr J. C. Dooley, Bureau of Mineral Resources,
PO Box 378, Canberra City, ACT 2601.
Hon. Secretary-Treasurer: Mr A. R. Brown, Geophysical
Branch, Bureau of Mineral Resources, PO Box 378,
Canberra City, ACT 2601.

NSW Branch
Chairman: Professor C. D. Ellyett, Physics Department,
University of Newcastle, NSW 2308.
Hon. Secretary: Mr T. M. Sabine, AEARE, Private Mail
Bag, Sutherland, NSW 2232.
Hon. Treasurer: Dr J. R. Bird, AEARE, 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-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 (acting): Dr. A. G. Fenton, Department of Physics, University of Tasmania, GPO Box 252C, Hobart, Tas. 7001.
Hon. Secretary-Treasurer: Mr. P. A. Hamilton, Department of Physics, University of Tasmania, GPO Box 252C, Hobart, Tas. 7001.

Vic. Branch
Chairman: Dr. A. J. Dyer, CSIRO Division of Meteorological Physics, Station Street, Aspendale, Vic. 3195.
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, University of Melbourne, Parkville, Vic. 3052.

WA Branch
Chairman: Dr. J. Graham, CSIRO, Private Bag, Wembley, WA 6014.
Hon. Secretary-Treasurer: Mr. B. W. Thomas, 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.
Joint Hon. Secretary-Treasurers: Mr. C. T. Clarke, Cancer Institute, 278 William Street, Melbourne, Vic. 3000.
Mr. F. J. Robertson, Radiation Protection Officer, Buildings Department, University of Melbourne, Parkville, Vic. 3052.

Geophysics Group
Chairman: Dr. A. J. Dyer, CSIRO Division of Meteorological Physics, Station Street, Aspendale, Vic. 3195.
Hon. Secretary-Treasurer: Mr. B. B. Hicks, CSIRO Division of Meteorological Physics, Station Street, Aspendale, Vic. 3195.

Education Group
Chairman: Mr. L. W. Pybus, 41 Harrow Road, Somerton Park, SA 5044.
Hon. Secretary-Treasurer: Mr. C. V. Lazz, 53 Arthur Street, Plympton Park, SA 5038.

Vacuum Physics Group
Chairman: Mr. J. Ward, 68 Peterswood Road, Elizabeth Park, SA 5113.
Hon. Secretary: Mr. R. H. S. Champion, PO Box 67, Norwood, SA 5067.
Hon. Treasurer: Mr. F. C. Gillespie, 6 Reginald Avenue, Findon, SA 5023.

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 1970 are listed below:
ANZAAAS: Mr. F. J. Lehany
Australian Journal of Physics Advisory Committee: Dr. J. P. Wild

Australian UNESCO Committee for Natural Sciences: Mr. W. C. Swinbank
National Association of Testing Authorities: Dr. N. B. Lewis
Australian National Committee on Illumination: Mr. J. E. Shaw
Australian Institute of Radiography: Mr. J. F. Richardson
Australian Metric Research Organization: Mr. H. J. Frost
Acoustics Standards Committee of Standards Association of Australia: Dr. R. W. R. Muncey
Australian Academy of Science National Committee for Physics: Mr. A. F. A. Harper

A. F. A. Harper
President

AUSTRALIAN INSTITUTE OF PHYSICS
COUNCIL FUNDS
INCOME AND EXPENDITURE FOR THE YEAR ENDED 30 SEPTEMBER 1970

<table>
<thead>
<tr>
<th>Income</th>
<th>$</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Members' subscriptions for 1970</td>
<td>15597.18</td>
<td></td>
</tr>
<tr>
<td>Members' subscriptions for 1999</td>
<td>926.99</td>
<td></td>
</tr>
<tr>
<td>Entrance fees and sundry income</td>
<td>417.99</td>
<td></td>
</tr>
<tr>
<td>Interest from bank and investments</td>
<td>1067.82</td>
<td></td>
</tr>
<tr>
<td>Receipt duty recovered</td>
<td>85.27</td>
<td></td>
</tr>
<tr>
<td>Share of clerical expenses (London)</td>
<td>140.00</td>
<td></td>
</tr>
<tr>
<td>Exhibition and Summer School Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance from BUMP Project</td>
<td>380.99</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Expenditure</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative</td>
<td>2866.89</td>
</tr>
<tr>
<td>Salaries and Wages</td>
<td>433.02</td>
</tr>
<tr>
<td>Rent and Cleaning</td>
<td>731.40</td>
</tr>
<tr>
<td>Printing, Stationery and Insurance</td>
<td>348.88</td>
</tr>
<tr>
<td>Postage and Telephone</td>
<td>118.30</td>
</tr>
<tr>
<td>Receipt Duty paid</td>
<td>37.68</td>
</tr>
<tr>
<td>Sundry and Bank Charges</td>
<td>113.09</td>
</tr>
<tr>
<td>Distribution of AJP</td>
<td>150.00</td>
</tr>
<tr>
<td>Depreciation</td>
<td>1499.35</td>
</tr>
<tr>
<td>Council Meetings</td>
<td>596.74</td>
</tr>
<tr>
<td>Subscriptions to &quot;The Australian Physicist&quot;</td>
<td>5000.00</td>
</tr>
<tr>
<td>Branch and Group Activities</td>
<td>3584.00</td>
</tr>
<tr>
<td>Grants</td>
<td>431.90</td>
</tr>
<tr>
<td>Special Visiting Lecturers</td>
<td>1132.50</td>
</tr>
<tr>
<td>Conferences and Lectures</td>
<td>5148.40</td>
</tr>
<tr>
<td>Interest paid to Reserve and Benevolent Funds</td>
<td>608.00</td>
</tr>
<tr>
<td>Balance of BUMP Project</td>
<td>381.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total</th>
<th>18367</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deficit</td>
<td>1653.40</td>
</tr>
<tr>
<td>Surplus</td>
<td>2082.84</td>
</tr>
</tbody>
</table>

The Australian Physicist, April 1971
AUSTRALIAN INSTITUTE OF PHYSICS

BENEVOLENT FUND ACCOUNT

\[
\begin{align*}
\text{Balance at 1.10.69} &\quad 2578.72 \\
\text{Members’ contributions and interest} &\quad 307.67 \\
\text{Less payments} &\quad \\
\hline
\text{Nett Surplus} &\quad $682.84 \\
\hline
\end{align*}
\]

AUSTRALIAN INSTITUTE OF PHYSICS

COUNCIL FUNDS

BALANCE SHEET AS AT 30 SEPTEMBER 1970

\[
\begin{align*}
\text{1969 Current Assets} &\quad $ & & $ \\
455 \text{ Cash in Hand or in Transit} &\quad 100.00 \\
3032 \text{ Balance in Bank} &\quad 2787.48 \\
147 \text{ Prepayments} &\quad 25.11 \\
11000 \text{ Investments at cost (see list in Consolidated Institute Accounts)} &\quad 14752.50 \\
\hline
\text{Fixed Assets at cost, Less Depreciation:} &\quad \\
1188 \text{ Furniture and Fittings} &\quad 1099.00 \\
315 \text{ Plant} &\quad 414.00 \\
\hline
16137 \text{ Operating Assets held by Council} &\quad 19178.09 \\
\hline
\text{Current Liabilities} &\quad 363.05 \\
289 \text{ Sundry Creditors} &\quad 387.59 \\
351 \text{ Subscriptions in Advance} &\quad \\
675 \text{ ‘The Australian Physicist’ Reserve funds (see table)} &\quad \\
8914 \text{ Branches and Groups} &\quad 10437.00 \\
10229 \text{ Operating Liabilities of Council} &\quad 11187.64 \\
5908 \text{ Excess of Assets over Liabilities} &\quad $7990.45 \\
\hline
\end{align*}
\]

AUSTRALIAN INSTITUTE OF PHYSICS

THE AUSTRALIAN PHYSICIST

INCOME AND EXPENDITURE STATEMENT FOR YEAR ENDED 30 SEPTEMBER 1970

\[
\begin{align*}
\text{1969 Income} &\quad $ & & $ \\
4450 \text{ Subscriptions from AIP} &\quad 5000.00 \\
2560 \text{ Advertising} &\quad 3018.40 \\
680 \text{ Sales and Subscriptions} &\quad 992.94 \\
31 \text{ Bank Interest} &\quad 60.21 \\
\hline
7726 & & & 9071.55
\end{align*}
\]

AUSTRALIAN INSTITUTE OF PHYSICS

RESERVE FUNDS 1 OCTOBER 1969 TO 30 SEPTEMBER 1970

\[
\begin{align*}
\text{Balance at 1.10.69} &\quad \text{Deduct} &\quad \text{Add} &\quad \text{Special} &\quad \text{Annual} &\quad \text{Balance at 30.9.70} \\
\text{at} &\quad \text{Withdrawals} &\quad \text{Undrawn} &\quad \text{Activities} &\quad \text{Interest} &\quad \\
\hline
\text{Branches} &\quad $ & & $ & & $ \\
ACT &\quad 451 &\quad - &\quad 248 &\quad - &\quad 31 &\quad 730 \\
NSW &\quad 1584 &\quad 300 &\quad 900 &\quad - &\quad 88 &\quad 2272 \\
Qld &\quad 570 &\quad 100 &\quad - &\quad - &\quad 38 &\quad 508 \\
SA &\quad 630 &\quad - &\quad 145 &\quad - &\quad 43 &\quad 818 \\
Tas. &\quad 297 &\quad - &\quad 83 &\quad - &\quad 20 &\quad 400 \\
Vic. &\quad 4156 &\quad 300 &\quad - &\quad - &\quad 284 &\quad 4140 \\
WA &\quad 469 &\quad - &\quad 241 &\quad - &\quad 32 &\quad 742 \\
\hline
\text{Groups} &\quad $ & & $ & & $ \\
Biophysics &\quad 12 &\quad - &\quad 5 &\quad - &\quad 1 &\quad 18 \\
Education &\quad 62 &\quad - &\quad 168 &\quad - &\quad 4 &\quad 234 \\
Geophysics &\quad 436 &\quad - &\quad - &\quad - &\quad 50 &\quad 466 \\
Vacuum Physics &\quad 247 &\quad 150 &\quad - &\quad - &\quad 12 &\quad 109 \\
\hline
\text{Council Funds} &\quad $ & & $ & & $ \\
Subscriptions &\quad - &\quad - &\quad 400 &\quad - &\quad - &\quad 400 \\
Printing &\quad - &\quad - &\quad 1000 &\quad - &\quad - &\quad 1000 \\
\hline
\text{Total} &\quad $8914 &\quad $850 &\quad $3190 &\quad - &\quad $583 &\quad $11837 \\
\hline
\end{align*}
\]

The Australian Physicist, April 1971 61
Expenditure
5792  Publication costs*  7501.46
1084  Distribution costs*  1382.07
250   Accountancy and Clerical  250.00
30    Postage and Duty Stamps  28.14
83    Printing and Stationery  15.79
5     Sundries  15.20

_____________  _______________
11232.56    9192.66

473  Surplus (Deficit)  $(121.11)


Investments at cost
2000  Mut. Acc. Ltd 7%  50.671  2000.00
2000  GAGA Ltd 7%  15.772  2000.00
2000  AGC Ltd 7%  31.127  2000.00
3000  All. Hold. Ltd 81%  5.974  3000.00
2000  ASL 81% 5.975  3000.00
--- BF Ltd 7% 28.277  2752.50

14752.50

Fixed Assets
1503  Plant, furniture and
       fittings  1513.00

18935  Total Assets  22706.74

BALANCE SHEET FOR YEAR ENDED
30 SEPTEMBER 1970

1969  Current Assets  $  $  
15  Cash in Hand  7.79
1531  Bank Accounts  1932.47
532  Accounts receivable  832.14
675  Additional AIP Grant (to be
       received)  ---

2772.40

Current Liabilities
1327  Accounts payable  1453.61
11  Subscriptions in Advance  25.20

1478.81

Accumulated Funds
1415  Funds at 30.9.69  1414.70

Less deficit for year  121.11

$1293.59

AUSTRALIAN INSTITUTE OF PHYSICS
CONSOLIDATED INSTITUTE ACCOUNTS

BALANCE SHEET AS AT 30 SEPTEMBER 1970

1969  Current Assets  $  $  
3467  Council Funds  2887.48
406   ACT Branch  156.49
225   NSW Branch  180.56
109   Qld Branch  45.79
330   SA Branch  424.99
85    Tas. Branch  85.26
225   Vic. Branch  733.97
163   WA Branch  97.59
107   Biophysics Group  34.01
128   Education Group  218.02
202   Geophysics Group  321.96
237   Vacuum Physics Group  633.95
425   BUMP Project  ---
195   SAR Arcs Project  195.46
--- SA Senior School Physics Course Fund  220.60
147   Prepayment: Council Funds  25.11
165   Accounts receivable by Vacuum
       Physics Group Symposium  180.00

6432  6441.24

Current Liabilities
136  Sundry Creditors of
289  Council Funds  363.05
20   NSW Branch  20.00
--- Vic. Branch  175.00
--- NSW Section, Education Group  9.50
--- Vacuum Physics Group Symposium  28.50
350  Subscriptions in Advance  387.59
675  "The Australian Physicist"  ---

425  BUMP Project  ---
195  SAR Arcs Project  195.46
--- SA Senior School Physics Course Fund  220.60

2090  Total Liabilities  1399.70

Accumulated Funds
General Accumulated Funds

7931  Balance at 1.10.69  7930.97
Add surplus for 1970  2939.07
Less appropriation for Reserves  1400.00

9470.04

Reserve Funds
8914  Branches and Groups 10437.00
--- Council  1400.00

18845  11837.00

$21307.04

AUSTRALIAN INSTITUTE OF PHYSICS
CONSOLIDATED INSTITUTE ACCOUNTS

INCOME AND EXPENDITURE STATEMENT FOR
YEAR ENDED 30 SEPTEMBER 1970

1969  $  
(1410)  Surplus (Deficit) arising from year's
       activities after making the following charges:
       Audit and Accountancy fees  217.00
       Directors' fees  ---
       Depreciation of fixed assets  113.00
       Interest on Reserve and
       Benevolent Funds  808.00

2939.07

62  The Australian Physicist, April 1971
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 1970 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
26 January 1971

Signed:  GORDON QUINN & CO.
Chartered Accountants

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 1970, 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

Dated: 28 January 1971

Signed:  J. K. MACKENZIE
        J. G. CAMPBELL

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 Dandenong in the State of Victoria this 28th day of January 1971.

Signed:  J. G. CAMPBELL
Before me: A. C. DOWNARD, JP

BOOK REVIEWS

A GERMAN SOURCE-BOOK IN PHYSICS,

Reviewed by Walter Boas, Metallurgy Department, University of Melbourne.

Anybody active in science will not be satisfied with the knowledge of today's ideas and most reliable experimental evidence. He will also want to know how the current concepts developed, not only to appreciate better their significance, but also because he may be able to apply this knowledge when he encounters a situation requiring a further development. It is therefore an important part of the education of a scientist to read original publications which were significant in the development of his subject. There arise special difficulties if such papers are not in the reader's mother language. Thus a physicist cannot avoid reading publications in German. This book aims at helping physicists over this hurdle. It presents a selection of extracts of significant books and papers published in German. The editors have annotated the text to explain difficult linguistic points and to help with words the meaning of which cannot be readily ascertained from dictionaries; some of the rather involved, typically German constructions have been explained. Thus readers with some knowledge of German from school or a science language course at a University should not find great difficulties in working through the passages and after a little experience even enjoy it.

The extracts have been selected with great skill. In order to restrict the size of the book it was necessary not only to select the most significant publications (original papers and definitive reviews from books)

The Australian Physicist, April 1971  63
but also to take from them those passages which contain the vital argument and new idea. Many papers are therefore not reprinted in full but the extraction has been done in a way that one rarely notices (not as with a film cut by a censor), that some paragraphs have been cut out. The text always makes uninterrupted reading and all the details one would want to know are there.

Each extract is preceded by an introduction in English which points out the new physical idea and the significance in the historical context of the passage. These introductions are gems of insight in the development of the subject and in the history of the epoch. It is worth while reading the introductions even for themselves.

The extracts start with Planck's paper on black-body radiation in 1901. They cover the theories of the specific heat of solids, relativity, X-ray interference, quantum theory, quantum statistics, quantum mechanics, electron theory of metals, lattice imperfections, ferroelectricity, and end with the papers on the fission of the uranium nucleus (Hahn and Strassmann 1939) and by Mössbauer (1958) on the effect named after him. During the first thirty years of this century physics in Germany had reached such a high international reputation that many physicists of other countries published their work in Germany. We thus have amongst the authors non-Germans such as Bohr, Born, Fermi, Gamow, Landsberg and Mandelstam, and Busch and Scherrer. The important contributions by Planck, Einstein, Born, Schrödinger, Heisenberg, and Sommerfeld are there, and many others which were important steps in the development. Of the 46 passages 44 appeared before 1935. The great period of physics in Germany then ended; the exodus of the many prominent scientists had taken place.

The authors have to be congratulated on their selection of the passages, the introductions and the annotations. The book will be of very great benefit to those learning and teaching science German. And the physicist interested in the development of his subject during the first half of this century will enjoy reading it and, at the same time, profit from doing so.


Reviewed by W. I. B. Smith, School of Physics, University of Sydney.

In the eight years since the first edition, this book has become well regarded as an authoritative yet still an introductory text on the physics of atomic spectra, stressing the observational facts and the correspondence between classical and quantum concepts of the atom. The new edition reflects that during these years, while the basics of the subject have remained the same, considerable new developments have occurred particularly in the realm of radio-frequency spectroscopy. The second edition includes new material on atomic-beam resonance, double resonance, level crossing, highly excited states, auto-ionization, isotope shifts, configuration interaction, and the widths of spectral lines.

As with the earlier one, the new edition is highly recommended as a sound basic text on the theoretical and observational aspects of atomic spectra.


Reviewed by R. J. Bray, CSIRO Division of Physics, Sydney.

This little book by a leading British specialist is intended as an introduction to the ionosphere and magnetosphere for 'students and the general reader'. The book is well written and illustrated but, in the reviewer's opinion, is pitched at too advanced a level for the intended audience. The main emphasis is on the ionosphere. Using a historical approach, the author lucidly describes the production and properties of the various ionized layers and the mechanisms of reflection and absorption in such a medium. Methods of ionospheric sounding are carefully described and modern ideas concerning the various types of ionizing radiation involved are expounded. The book closes with a too-short chapter dealing with the part played by the ionosphere in helping (and hindering) radio communication, including descriptions of some interesting anomalies as the 'Luxembourg effect'. This volume—one of a series—will chiefly benefit those readers whose physics background is sufficiently extensive to help their understanding of the many subtleties of a difficult subject and whose interests lie in different but related fields.


Reviewed by W. I. B. Smith, University of Sydney.

This text on atomic physics has been translated into a number of languages, and the reviewer's copy is from the 5th Russian edition of what the foreword states is an outstandingly successful textbook. The date of the Russian edition is not stated, but apart from pages 357-360 which deals with the laser, it reads like an excellent text of thirty or more years ago. The Planck–Sommerfeld quantum theory is introduced on page 295 after a full treatment of the classical mechanics and electromagnetism of the atom. Schrödinger's equation is introduced on page 535. There is no mention of quantum operators, and no treatment of angular momentum beyond that of the Bohr theory. On pages 590-599 a rather nice elementary treatment of the Van der Waals potential is derived using Schrödinger's equation. To sum up, this is an excellent book, a pleasure to read, but it is a journey back to the 1930's and earlier; the material is very sound and well chosen, but there is no hint of that outlook on quantum mechanics which has been popularized over the past seven or so years by the Feynman text. Shpol'skii's book can be highly recommended to a student wishing to study the classical historical background to present day atomic physics.
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