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NI/64/First Meeting

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

GOVERNING BOARD

Minutes of the meeting held at No. 5, Old Palace Yard, Westminster, London on 16th March, 1964.

Present: Lord Bridges (Chairman)
Dr. J. B. Adams
Sir Robert Aitken
Professor F. W. R. Brambell
Sir John Cockcroft
Professor P. I. Dee
Professor B. H. Flowers
Sir Alan Hitchman
Professor C. F. Powell
Dr. F. A. Vick
Professor D. H. Wilkinson
Sir John Wolfenden
Professor A. W. Merrison
Dr. T. G. Pickavance
Dr. J. A. V. Willis (Secretary)

Mr. H. J. Millen attended for discussion of the finance items.

Apologies for absence were received from Sir William Hodge, Sir Harrie Massey, Sir Harry Melville and Dr. E. M. Wright.

1. MEMBERSHIP

The Chairman said that Professor Cassels and Sir William Penney had retired from the Board on 15th February, 1964. The Government had appointed Professor Wilkinson and Dr. Vick to fill these vacancies and he welcomed them to the meeting.

The Chairman added that in consequence of these changes he had asked Professor Flowers to succeed Sir William Penney as Chairman of the Atlas Computer Committee after their next meeting and that he had asked Dr. R. Spence, C.B., F.R.S. to take Dr. Vick's place on the General Purposes Committee and Mr. T. B. Le Cren to take Dr. Vick's place on the Personnel Committee. The Chairman also invited Professor Wilkinson to join the General Purposes Committee in place of Professor Cassels and Professor Wilkinson agreed to do so. The Board approved these appointments.

2. MINUTES OF THE LAST MEETING

The Board approved the Minutes of the meeting on 9th December, 1963.

3. MATTERS ARISING FROM THE MINUTES

Minute 2: The Trend Report - The Chairman said that he had received an acknowledgement of his letter to the Minister for Science, which had been circulated before the last meeting. Apart from the statement made in Parliament on 6th February, 1964 that the Government intended to follow the recommendations of the Trend Committee there was no further development to report.

Minute 6: Annual Report - The Chairman said that copies of the Sixth Annual Report had been circulated since the last meeting. He asked Members to send any comments, particularly on the balance between scientific and general matter, to the Secretary so that they should be taken into account in preparation of the next report. He was inclined

to think that the balance was about right in the present report but would be grateful for any views which were expressed.

4. PROGRESS AT THE RUTHERFORD LABORATORY - NI/64/2

The following points arose in discussion of Dr. Pickavance's report:

(a) Dr. Pickavance said that there was a tendency for university groups at present working on the P.L.A. to move to experiments on Nimrod. It would be necessary to watch carefully that the present scientific standard of experiments on the P.L.A. was maintained.

(b) In reply to a question Dr. Pickavance confirmed that it was his policy to develop Nimrod to the highest possible beam intensity. At the moment, however, priority was being given to the establishment of reliable operation. He believed that the intensity could be increased to 10^{12} protons per pulse quite readily but some studies on radiation damage to the vacuum vessel would be made first.

(c) The time available for experiments was at present 85 hours per week and was not likely to be increased further during the rest of 1964. At present the reasons for not working longer hours were operational rather than financial.

(d) The restriction of operation to weekends in the past winter was deplored. It was stated that this limitation of the use of Nimrod in its first year could not be understood by the universities and caused a lack of confidence in the Institute. Dr. Pickavance said that he was determined to run Nimrod in the day time next winter but the financial situation was such that he was not in a position to go on record as saying definitely that this would be done. The Chairman said that the case would be so strong that he believed that even if there were financial difficulties it would be possible to secure agreement to run Nimrod in the day time.

(e) It was also emphasised that it was important to run Nimrod for continuous periods of at least a few days and nights because in this way the time was more efficiently available for experiments.

(f) The inclusion of additional experimental physicists on the selection panel for Nimrod experiments was noted with approval.

5. PROGRESS AT THE DARESBURY LABORATORY - NI/64/3

Professor Merrison said that after the initial delays a good start had been made with the building programme. This was largely due to the efforts of the A.E.A. Engineering Group and of the main contractor, who was proving to be efficient, as well as to the mild weather. Of the plant items, the radiofrequency accelerator structure was the only item not yet designed. This was an item requiring development by the Daresbury staff and it had always been known the design of it would be the last to be completed. Prototypes had first to be tested at high power and this would not be done before May or June.

The Chairman congratulated Professor Merrison on behalf of the Board on the progress which appeared to be very satisfactory.

6. COMMITTEES

The Board took note of the Minutes of the following meetings:-

Atlas Computer Committee	- 13th November, 1963
Physics Committee	- 19th December, 1963
General Purposes Committee	- 3rd February, 1964
Research Reactor Committee	- 13th February, 1964

The Chairman asked Sir John Cockcroft to deal with the Minutes of

the Physics Committee and the Research Reactor Committee in the course of discussion of the next item.

7. REVIEW OF THE INSTITUTE'S PROGRAMME - NI/64/4

7.1 Sir John Cockcroft said that the Physics Committee's recommendations were summarised in paper NI/64/4. Referring to the five items recommended in paragraph 2 of the paper, Sir John said that adequate use and development of existing accelerators in the United Kingdom and C.E.R.N. had been put first in order of priority, implying also financial priority. With regard to the second item, namely support of the European Accelerator programme he emphasised the importance which had been given by the Committee to efforts to have the proposed high energy accelerator sited in this country. He also added that while not separating their support of the proposed high energy accelerator and of the proposed C.E.R.N. storage rings, the Committee had made it clear that in their view the former was much the more important.

Finally Sir John drew attention to the need for additional computing facilities for high energy physics, referred to in the last paragraph of the report. The Committee had set up a working party to study these needs. Sir John made the personal comment that he did not think the requirement would necessarily be for a central computer in the Institute; it might rather be for several smaller computers in the university centres.

7.2 European programme: Dr. Adams gave the latest information on the European accelerator programme. He said that Professor Weisskopf had arranged a meeting in May to discuss with the Russians and the Americans the possible inter-continental accelerator. Sir Harry Melville and Dr. Adams would be attending. It seemed to Dr. Adams that an inter-continental project was now only likely to be considered for an accelerator of greater than 1,000 GeV. He therefore believed that accelerators of about 300 GeV would be built in the same areas as those of 30-70 GeV, i.e. in the U.S.A., Europe and U.S.S.R. Dr. Adams said that the Scientific Policy Committee of C.E.R.N. might now recommend a reduction in energy of the European accelerator from 300 to 250 GeV in exchange for ensuring that storage rings on the C.E.R.N. proton synchrotron stayed in the programme. Finally, it was now clear that the host country for the European accelerator would be expected to make a large special contribution to its finances.

7.3 Relationship of the European programme to the N.I.R.N.S. Forecast: Attention was drawn to the fact that the Physics Committee's priority list included in second place the European accelerator project, whereas the financing of this was not the Institute's responsibility. However, it was pointed out that the A.C.S.P. had asked the Institute to include the European project in their consideration of priorities and also that the Institute were the best qualified body to do so. The Chairman said that the wording of the priority recommendation needed to be amended to take account of these points and that he would deal with this.

7.4 High Flux Beam Reactor: Sir John Cockcroft said that the Research Reactor Committee had considered a project for a reactor primarily for solid state physics research, providing neutron beams of 10 times the intensity at present available in this country. The project had first been considered in the A.E.A. and then had been taken up by the European Nuclear Energy Association, but the latter had decided that no action on it could be taken for two years. The Research Reactor Committee had discussed the possibility of keeping the project alive. The latest information was that the A.E.R.E. were considering a possible project of a rather similar kind and that a conference of prospective users had been arranged to take place in July. Dr. Vick said that the Harwell scheme was for a pulsed neutron source, a more ambitious project than the high flux beam reactor. It was at an early stage of consideration and should be regarded as confidential at this stage.

The Chairman asked whether anything should be put in the five-year forecast for a high flux beam reactor or other source of high neutron flux. Sir John Cockcroft said that he did not think that we were at present in a position to put in any forecast. He did think that the Board ought to consider their long-term responsibilities for providing reactor facilities when they had clearer information to work on but he suggested that it would be better to defer this consideration for the present.

Professor Dee said that the potentialities of the 100 MeV electron linear accelerator as a high intensity neutron source should be kept in mind.

8. EXCHANGE OF LETTERS ON FUTURE INSTITUTE EXPENDITURE - NI/64/5

The Chairman asked the Board what they thought should be the basis of their five-year forecast of expenditure, in view of the correspondence with Mr. Turnbull, copies of which had been circulated under reference NI/64/5. It was noted that the Chief Secretary to the Treasury had proposed levels of expenditure in the years 1964/65 to 1967/68 equal to the figures identified by the Institute in October, 1963 as "rock bottom" for maintaining the two Laboratories. The Board agreed, however, that the basis of their forecast should be the programme which they thought right.

9. THE FIVE-YEAR EXPENDITURE FORECAST 1965/70 - NI/64/6

9.1 The Chairman asked for comments on the draft forecast.

(a) Members pointed out that the forecast of total expenditure excluding Atlas showed a rate of rise substantially less than 15% per annum whereas it was stated that a rise of 15% per annum was typical of a lively and developing subject, and was the approximate rate of rise of expenditure in the country on science and technology as a whole.

(b) It was explained that the forecast figures for the Atlas Computer Laboratory had not yet been seen by the Atlas Computer Committee who might wish to make changes at their meeting on 6th May.

In reply to a question as to the proportion of the time of the Institute's Atlas Computer which would be used for nuclear physics, Dr. Pickavance said that for the present about one-quarter was expected to be directly allocated to nuclear physics, and after allowing for the needs of the Authority it was expected that universities and Government departments would use up to one half of the total time for work other than nuclear physics.

(c) The forecast for the "present nuclear physics programme" was dealt with next. Dr. Pickavance said that this forecast had been made to correspond with the figures for reasonable exploitation of the two Laboratories which Professor Merrison and he had had to give to the Minister's Office in October, 1963 (with minor changes at Daresbury which could be justified). However, additional provision for the Rutherford and Daresbury Laboratories had been included in the forecast for the "additional programme". The Board enquired into this additional provision. Dr. Pickavance said that the additional amount at the Rutherford Laboratory was intended to increase the number of university physicists catered for from about 200 to about 300, mainly on additional track analysis work. Manning of all three large bubble chambers was allowed for as well as additional film measuring facilities for universities on the basis of the types of equipment now under consideration. Bringing forward the second main experimental area was not provided for, nor was possible future development in the complexity and cost of equipment.

Professor Merrison said that the additional provision for the

Daresbury Laboratory was labelled "storage rings" but in the event this particular project might not be the one chosen. He also emphasised the very tentative nature of the Daresbury forecast in the last three of the five years.

The Board decided that the "additional programme" should be divided, that part required for the existing laboratories being identified as such.

(d) The Board then considered the new projects forming the rest of the "additional programme". It was argued that the nuclear structure laboratory was essential to the healthy survival of nuclear structure research in this country and that the provision for computer facilities for nuclear physics, although not yet worked out in detail, was essential for the proper use of C.E.R.N. and the Institute's accelerators. These new projects must therefore take their place very firmly in the five-year forecast. Mr. Millen drew attention to the sums set against these items as shadow cuts, and it was agreed that these shadow cuts should be re-examined, in view of the fact that both the electrostatic generator and computer were available from commercial sources.

(e) It was suggested that as the Institute's forecast included provision for some equipment planned in universities, there ought to be a mechanism for consulting university departments. Dr. Pickavance said that through close contact with university departments there was a good deal of general information about their plans, which was helpful in making the forecasts.

9.2 The Board agreed that the forecast should be submitted with substantially the figures in the present draft, the arrangement of the "future projects" being recast as proposed in the last paragraph of (c) above, the shadow cuts being reviewed and the Atlas Computer Laboratory figures being subject to revision after the Atlas Computer Committee's meeting. The assumptions on which the forecast was based should be plainly stated, and in particular it should be stated that the provision for experiments was on the basis of the types and scale of equipment used for experiments now being planned, and did not allow for major changes in the scale of experiments.

10. SUGGESTED IMBALANCE BETWEEN THE SUPPORT OF NUCLEAR AND NON-NUCLEAR RESEARCH IN THE UNIVERSITIES - NI/64/1

The Chairman said that he had now obtained a copy of the memorandum forwarded by the Research Council of the D.S.I.R. to the Lord President on the above subject. Copies would be circulated to Members in confidence. He asked Members to consider whether there were points in the memorandum to which the Institute should reply, and if so to communicate with Dr. Pickavance so that a co-ordinated draft might be prepared.

J. A. V. Willis,
Secretary.

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