

5th March, 1964

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NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

GOVERNING BOARD

Five-Year Forecast of Expenditure and Staff Numbers, 1965-70

Note by Finance Officer

Introduction

1. The forecast of expenditure and staff numbers needed for the Institute's work in the years 1965/70 is set out in the enclosed tables. The expenditure forecast (excluding provision for Atlas) is summarised below and compared with relevant earlier figures. The 1964-69 forecast was not endorsed by the Minister for Science but, later in the year, he accepted the four-year programme shown.

	1964/65	1965/66	1966/67	1967/68	1968/69	1969/70
	£M	£M	£M	£M	£M	£M
1964/69 forecast <sup>+</sup>	8.4	9.0	10.1	10.2	10.6	
Four-year programme <sup>+</sup> accepted by the Minister	8.46	9.26	9.56	9.29		
Present nuclear physics programme	8.20	9.26	9.74	9.55	10.02	10.40
Additional programme	-	.81	1.73	2.84	3.45	3.61
Total current forecast	8.20	10.07	11.47	12.39	13.47	14.01

<sup>+</sup>Adjusted to current pay and price levels

2. The adjustments in the foregoing table to bring the earlier forecasts to January, 1964 pay and price levels amount to 3%. The Authority's advice is that during the period December, 1962-January, 1964 the price levels for both stores and capital rose by this percentage; and during the period there were wage and salary increases of the same order of magnitude.
3. The Directors recognise that the substantial sums by which the new forecast exceeds the programme accepted by the Minister make it unlikely that the new forecast will be approved in full. They do not, however, consider that this should affect the assessment of the developments needed to enable the U.K. to continue to play a leading role in nuclear and high energy physics research, or the estimation of the resulting cost.
4. The current forecast takes account of the discussion at the G.P.C. meeting on 3rd February, 1964, at which the first draft of the forecast was considered.
5. The chief reason for the substantial differences between the four-year programme accepted by the Minister and the current forecast is the insertion of several major new schemes additional to the present nuclear physics programme:-



- (a) The Nuclear Structure Laboratory, housing a large electrostatic generator, has been reinstated in the forecast.
- (b) Provision has been made following discussions in the Physics Committee (NI/PC/63/2) for a large computer (costing £1.75M) for nuclear and high energy physics work.
- (c) Provision has been made for an expansion of the existing Rutherford programme to meet an expected increase in the demands from universities.

In addition, delay in acquisition of the Daresbury site has led to some slipping of capital expenditure from 1963/64 through 1964/65 into the forecast period, and there are some relatively small increases in both capital and non-capital expenditure. Offsetting these increases, the major extension of the P.L.A. has been dropped from the forecast. Owing to the state of discussions with European countries, no more than token provision has been made for the major new U.K. accelerator; and, in view of the present uncertainty, no provision has been made for the Research Reactor.

- 6. The major new schemes have been phased in a way that is believed to be realisable and which results in a reasonable trend of total expenditure over the forecast period. If the Board accept this view they will no doubt wish to go on to consider whether schemes should be rephased or deleted in order to bring expenditure closer to the Minister's planning figures, or the forecast should be endorsed and the responsibility for cuts placed on Ministers.

#### Rutherford Laboratory - current programme

- 7. The current programme at the Rutherford Laboratory accords closely with that underlying the four-year figures 1964/68 accepted by the Minister last year. Some reduction in expenditure, in real terms, is implicit in the forecast because, although wages and salaries have been provided for at current levels, the annual totals remain numerically the same as those in the totals accepted by the Minister.

#### Expansion at Rutherford Laboratory

- 8. The number of research workers in nuclear or high energy physics now using or planning to use the Rutherford Laboratory is approximately 210, of whom 170 are university staff and research students. The P.L.A. is nearly fully occupied already, but NIMROD is capable of providing for many more users and more people will wish to use it. Existing potential users cannot all be catered for by the present programme. In view of current Government policy to expand university education, particularly in science, it seems reasonable to assume an increase of about 50% in the total number of university staff and research students using NIMROD, over a five-year period beginning in 1966-67. The expenditure and staff numbers shown in Table 5A under this heading provide for such an increase, which could be achieved without any new major capital project.
- 9. It can be argued that the implementation of the Robbins recommendations will lead to a larger and earlier increase in usage of NIMROD than is provided for in this proposal. The Governing Board may wish to consider whether these increases should be assessed and proposals drawn up to meet them.

#### Expenditure at D.N.P.L.

- 10. The expenditure now forecast at D.N.P.L. provides for a 3% increase in the capital cost of the NINA project above the sanction to reflect the



substantial pay award to building workers in November, 1963, and an estimated increase in major plant prices of the same order of magnitude.

11. The basic D.N.P.L. forecast shows a net increase of some £1.15M over the basic D.N.P.L. figures in the four-year programme approved by the Minister, after adjustment of the latter to current pay and price levels:-

<u>1964-65</u>	<u>1965-66</u>	<u>1966-67</u>	<u>1967-68</u>
- £.08M	+ £.20M	+ £.65M	+ £.38M

The main items contributing to these increases are:-

- (a) the rephasing of expenditure amounting to £70,000 net, arising mainly from the slipping of NINA expenditure from 1963-64 as the result of delay in acquiring the Daresbury site;
  - (b) the insertion of a computer (£150,000) into the programme in 1965-66;
  - (c) increased provision for physics apparatus totalling £250,000;
  - (d) increased provision for building work totalling £250,000;
  - (e) the addition of the Positron facility costing £150,000;
  - (f) an increase in non capital expenditure of £280,000 to take account of experience at the Rutherford Laboratory.
12. The storage rings for NINA have been treated as a major new scheme outside the currently approved programme.

#### Nuclear Structure Laboratory

13. The proposals in Table 5A under this heading are based upon a report in June, 1963, to D.S.I.R., and subsequent discussions with electrostatic generator specialists and consultation with the High Voltage Engineering Corporation about delivery dates. The figures assume that recommendations about the siting of this project can be made within the course of the next few months, and that a detailed report from the group concerned with this project will be available in the autumn of this year as the basis for a recommendation to the Governing Board in September or November, leading to Treasury sanction for the project early in 1965. The forecast therefore assumes that there will be no artificial or other unforeseen delays in progress to the sanctioning stage.
14. The high rate of spend in the early years of the forecast period results from the fact that the Corporation could begin manufacture without major design and development effort and that their terms of business provide for payment of 10% of the capital cost at the time of order, with regular stage payments of the same amount during course of manufacture. It is believed that it should be possible to complete the building in the time scale shown and with phasing suitable for the installation of the accelerator. The expenditure on buildings in 1965-66 will consist almost entirely of fees.
15. If an existing site is recommended for this project, there should be appreciable savings in building expenditure depending on the facilities available.

#### Computer for Nuclear Physics

16. This project is still at a very early stage: the Physics Committee have arranged for a small working party to be formed to review the computing problem. There appears to be a growing belief that computing requirements for nuclear physics and allied fields will expand very rapidly in the next few years; and it seems prudent to provide for the single large computer shown in Table 5B at a site to be settled later, in order to make clear the order of magnitude of the funds needed.

#### Atlas Computer Laboratory

17. It has not been possible to arrange for the Atlas Computer Laboratory forecast (Table 6) to be considered by the Atlas Computer Committee, but it will be presented to the meeting of the Committee on 6th May, 1964. The main changes from the 1964-69 forecast are:-



- (a) a more rapid build-up of operating expenditure to meet an increased demand from universities;
- (b) a larger operating force resulting from a revised assessment of loading;
- (c) the deferment of the extension to Atlas to the end of the period with token financial provision only, in recognition of the inclusion of a Computer for Nuclear Physics in the list of major new schemes;
- (d) an increase in expenditure on computer research (E.M.R. and salaries of research staff) ranging from £30,000 p.a. to £45,000 p.a. above the level authorised for 1964-65 (£90,000 p.a.). It is for consideration whether research expenditure of this magnitude can be regarded as within the Ministerial sanction for the Atlas Laboratory or should be the subject of a separate submission.

#### Shadow Cuts

18. The Director, R.H.E.L. considers that his agreed share of the 1964-65 shadow cut must be taken as a firm planning cut in view of the very small amount of new capital provided in that year. This cut (£.25M) has therefore been incorporated in the R.H.E.L. 1964-65 figure throughout the tables. The Director emphasises that £6.25M is not a satisfactory figure within which to plan the Laboratory's work. To simplify presentation, the inescapable 1964-65 shadow cut of £.21M allocated to the Daresbury Laboratory has been carried into the expenditure figure for D.N.P.L. in the Expenditure Summary (Table 1) and has been reinstated in 1966-67. On the other hand, the sum of £250,000 which was included in the tentative D.N.P.L. total for 1966-67 in the four-year programme approved by the Minister, as the reinstatement of D.N.P.L. share of the 1965-66 shadow cut, has been omitted.
19. The other shadow cuts, applying partly to the new capital expenditure in the existing nuclear physics programme and partly to the additional programme, broadly follow the patterns set in the four-year forecast approved by the Minister and in the first draft of the 1964-69 Forecast (NI/63/4), with adjustments to allow for the increased level of expenditure proposed and for the cumulative effect of shadow cuts on major projects spread over a number of years.

#### Pay and Price Levels

20. The forecast has been prepared on the basis of pay and price levels ruling at January, 1964.
21. At the Treasury's request, an assessment has been made of the effect of the translation into the Institute's pay structure of the recent agreement for a pay increase of 10% over three years for non-industrial Civil Servants. (Table 8)
22. The Governing Board are invited:-
- (a) to approve, after amendment as necessary (with particular reference to the points in paragraphs 3, 6 and 9), the forecast for the current programmes at the nuclear physics laboratories and the phasing of and forecasts for the additional schemes, together with the shadow cuts in Tables 1 and 5;
  - (b) to endorse the Atlas Forecast subject to its subsequent approval by the Atlas Computer Committee and to confirmation that research expenditure at current and proposed levels is within the present sanction,
- and
- (c) to approve the submission of the complete forecast to the Minister's Office via the Authority under the enclosed covering letter, after any necessary final adjustments by the G.P.C.



Draft Covering Letter to Minister's Office

Dear

N.I.R.N.S. 1965/70 Five-Year Forecast

1. I enclose the Institute's forecast\* of expenditure and staff for the period 1965/70. The new expenditure forecast (excluding expenditure on Atlas) compares with the 1964/69 forecast and the four-year forecast approved by the Minister late in 1963, as follows:-

	1964/65	1965/66	1966/67	1967/68	1968/69	1969/70
	£M	£M	£M	£M	£M	£M
1964/69 forecast <sup>+</sup>	8.4	9.0	10.1	10.2	10.6	
Four-year programme <sup>+</sup> accepted by the Minister	8.46	9.26	9.56	9.29		
Present nuclear physics programme	8.20	9.26	9.74	9.55	10.02	10.40
Additional programme	-	.81	1.73	2.84	3.45	3.61
Total current forecast	8.20	10.07	11.47	12.39	13.47	14.01

<sup>+</sup>The 1964/69 forecast was based on pay and price levels at December, 1962 which remained the basis of the four-year forecast endorsed by the Minister later in the year. Pay and price movements since December, 1962 are assessed at 3% and the two forecasts prepared last year have been adjusted accordingly.

2. Expenditure on the current nuclear physics programme does not vary widely from the programme approved by the Minister, but substantial expenditure is now proposed on new major projects throughout the five-year period.

3. The Governing Board have considered very carefully the financial implications of the programme now put forward, but, notwithstanding the latest indications of Ministerial thinking on future N.I.R.N.S. expenditure, they are satisfied that if the purposes for which the Institute was established are to be properly fulfilled, and if research into nuclear science is to continue to flourish in this country, finance on the scale proposed must be found for the existing programme and for the new major projects proposed. It is considered quite unrealistic to make no provision for new schemes in the forecast: the results of research this year lead to new areas of exploration in subsequent years, and these inevitably call for new facilities. The last years of the current forecast must provide for starts on projects (e.g. storage rings) that will not come into use for eight or nine years.

\*It is proposed that the forecast to be submitted to the Minister's Office and Treasury should consist of Tables 1, 2, 3, 4, 5, 6, 7, and 8 together with the usual analysis of Institute expenditure by Authority subheads and the analysis of major capital project spends.



#### Rutherford Laboratory

4. The current programme at the Rutherford Laboratory (Table 3) accords closely with that underlying the four-year figures 1964-68 accepted by the Minister last year. Some reduction in expenditure, in real terms, is implicit in the forecast because, although wages and salaries have been provided for at current levels, the annual totals remain numerically the same as those in the totals accepted by the Minister.

#### Daresbury Laboratory

5. The expenditure now forecast at D.N.P.L. (Table 4) provides for a 3% increase in the capital cost of the NINA project above the sanction to reflect the substantial pay award to building workers in November, 1963, and an increase in major plant prices of the same order of magnitude.

6. The basic D.N.P.L. forecast shows a net increase of some £1.15M over the basic D.N.P.L. figures in the four-year programme approved by the Minister, after adjustment of the latter to current pay and price levels:-

<u>1964-65</u>	<u>1965-66</u>	<u>1966-67</u>	<u>1967-68</u>
- £.08M	+ £.20M	+ £.65M	+ £.38M

The main items contributing to these increases are:-

- (a) the rephasing of expenditure amounting to £70,000 net, arising mainly from the slipping of NINA expenditure from 1963-64 as the result of delay in acquiring the Daresbury site;
- (b) the insertion of a computer (£150,000) into the programme in 1965-66;
- (c) increased provision for physics apparatus totalling £250,000;
- (d) increased provision for building work totalling £250,000;
- (e) the addition of the Positron facility costing £150,000;
- (f) an increase in non capital expenditure of £280,000 to take account of experience at the Rutherford Laboratory.

#### New Major Projects (Table 5)

7. Since the 1964-69 forecast was submitted in May, 1963, the proposal to acquire a large electrostatic generator for research into nuclear structure has been followed up, and the Institute are confident that it will be possible to complete fairly detailed plans for the machine and the laboratory to house it in time for a request for capital sanction by about the end of the year. The machine, which would not require major design and development work, would be bought from an American company, and the Institute are satisfied that the apparently high rate of expenditure shown for the early years of the scheme is realistic.

8. It is becoming more and more apparent that the most effective use of Institute and university accelerators will require increasing computer facilities, and that, in particular, "on-line" facilities will very often be necessary. The size of this extra computer load, its timing, and the best way of siting and providing the facilities remain to be determined, but the Institute consider it prudent to provide for a major new computer for nuclear physics purposes towards the end of the forecast period and for a spend on the project as from 1966-67.

9. It is proposed that, in order to exploit NIMROD more effectively and to avoid turning away the increasing number of research workers who wish to undertake worthwhile experiments with it, there should be a modest expansion of the programme at the Rutherford Laboratory. It is planned, over a period of five years beginning in 1966/67, to allow for a 50% increase in the present number (170) of University staff and research students using the Laboratory. This expansion is considered by the Institute to be in keeping with Government policy of expanding university education, particularly in science. The new programme could be achieved without the addition of any new major capital project.

#### Shadow Cuts

10. To take account of unforeseen setbacks in capital expenditure, substantial shadow cuts have been applied both to the current nuclear physics programme and to the programme of major new schemes.

#### Atlas Laboratory

11. The Atlas Computer Laboratory forecast (Table 6) allows for modest increases in expenditure and in the phasing of expenditure to provide for the somewhat larger operating force now considered to be necessary in the light of detailed studies of operating requirements, and for earlier use of the machine on two or more shifts to meet the demand now expected.

#### Non-Industrial pay settlement

12. The effect of the application to Institute staff of the recent non-industrial pay settlement in the Civil Service is set out in Table 8.



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Table 1

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

Five Year Financial Forecast 1965-1970

(Expenditure Summary)

<u>Present nuclear physics programme</u>	<u>1964-65</u>	<u>1965-66</u>	<u>1966-67</u>	<u>1967-68</u>	<u>1968-69</u>	<u>1969-70</u>
	£M	£M	£M	£M	£M	£M
Rutherford Lab. (Table 3)	6.25	7.00	7.30	7.70	8.25	8.52
Daresbury Lab. (Table 4)	1.95	2.60	2.64	1.95	1.87	1.98
Total (gross)	8.20	9.60	9.94	9.65	10.12	10.50
Shadow cut	-	.34	.20	.10	.10	.10
Total (net)	8.20	9.26	9.74	9.55	10.02	10.40
<u>Additional programme</u>						
New major projects for High Energy and Nuclear Physics (after shadow cut)	-	.81	1.73	2.84	3.45	3.61
Total Expenditure (net) at nuclear physics laboratories	8.20	10.07	11.47	12.39	13.47	14.01
<u>Atlas Computer Laboratory</u>						
Total expenditure	1.65	1.26	1.14	1.00	.80	.88
GRAND TOTAL NIRNS (net)	9.85	11.33	12.61	13.39	14.27	14.89



NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCEFive Year Financial Forecast, 1965-70

(Staff Summary)

	<u>Staff in post at end of year</u>					
	<u>1964-65</u>	<u>1965-66</u>	<u>1966-67</u>	<u>1967-68</u>	<u>1968-69</u>	<u>1969-70</u>
R.H.E.L. - Present programme (Table 3)	965	1,050	1,100	1,140	1,170	1,200
D.N.P.L. (Table 4)	140	190	250	250	250	250
New major projects (Table 5)	-	10	58	152	256	351
Atlas Laboratory (Table 6)	60	100	105	105	105	105
Total Staff	1,165	1,350	1,513	1,647	1,781	1,906



Table 3

Rutherford Laboratory - Present Programme

(Summary)

	<u>1964-65</u> <u>Grant</u>	<u>1965-66</u>	<u>1966-67</u>	<u>1967-68</u>	<u>1968-69</u>	<u>1969-70</u>
	£000	£000	£000	£000	£000	£000
<u>EXPENDITURE</u>						
<u>Capital Expenditure</u>						
Major schemes in progress	1,193	330	100	120	120	120
Major new schemes	65	881	960	955	1,210	1,140
Minor capital	425	597	650	670	680	700
Total Capital	1,683	1,808	1,710	1,745	2,010	1,960
<u>Non Capital Expenditure</u>						
Salaries and general laboratory charges	2,802	3,242	3,470	3,695	3,850	4,040
Divisional budgets (less minor capital)	1,765	1,950	2,120	2,260	2,390	2,520
Total Non Capital	4,567	5,192	5,590	5,955	6,240	6,560
TOTAL EXPENDITURE (present programme)	6,250	7,000	7,300	7,700	8,250	8,520
<u>STAFF in post at end of year</u>						
Professional	365	390	420	435	445	460
Ancillary	350	400	410	425	435	445
Industrial	250	260	270	280	290	295
TOTAL STAFF	965	1,050	1,100	1,140	1,170	1,200





Table 4

## Daresbury Nuclear Physics Laboratory

(Summary)

	<u>1964-65</u> <u>Planned</u> <u>Expendi-</u> <u>ture</u>	<u>1965-66</u>	<u>1966-67</u>	<u>1967-68</u>	<u>1968-69</u>	<u>1969-70</u>
<u>Expenditure</u>	£000	£000	£000	£000	£000	£000
CAPITAL						
Schemes in progress	1,600	1,409	731	-	-	-
New Schemes	170	518	790	895	747	760
<b>TOTAL CAPITAL (gross)</b>	<b>1,770</b>	<b>1,927</b>	<b>1,521</b>	<b>895</b>	<b>747</b>	<b>760</b>
Shadow cut	- 210	-	+ 210	-	-	-
<b>TOTAL CAPITAL (net.)</b>	<b>1,560</b>	<b>1,927</b>	<b>1,731</b>	<b>895</b>	<b>747</b>	<b>760</b>
NON CAPITAL	390	677	905	1,055	1,123	1,221
<b>TOTAL EXPENDITURE</b>	<b>1,950</b>	<b>2,604</b>	<b>2,636</b>	<b>1,950</b>	<b>1,870</b>	<b>1,981</b>
<u>Staff in post at</u> <u>end of year</u>						
Professional	55	70	90	90	90	90
Ancillary	55	75	100	100	100	100
Industrial	30	45	60	60	60	60
<b>TOTAL STAFF</b>	<b>140</b>	<b>190</b>	<b>250</b>	<b>250</b>	<b>250</b>	<b>250</b>

N.B. The inescapable shadow cut of £210,000 on Daresbury capital in the approved 1964-65 Estimates has been restored at the end of the NINA Project spend in 1966-67.



Table 4A

## Daresbury Nuclear Physics Laboratory

CAPITAL

	<u>Total Major Capital</u>	<u>1964-65</u>	<u>1965-66</u>	<u>1966-67</u>	<u>1967-68</u>	<u>1968-69</u>	<u>1969-70</u>
	£000	£000	£000	£000	£000	£000	£000
<u>PLANT</u>							
<u>Schemes in progress</u>							
NINA Project	1,810	764	564	482	-	-	-
<u>Schemes not yet started</u>							
External electron beam	155	-	40	70	45	-	-
Physics apparatus	-	10	30	290	320	340	360
Positron facility	150	-	50	80	20	-	-
Computer	150	-	150	-	-	-	-
Minor plant	-	100	120	130	140	150	150
<b>TOTAL PLANT</b>	-	874	954	1,052	525	490	510
<u>BUILDINGS</u>							
<u>Schemes in progress</u>							
NINA Project	2,180	836	845	249	-	-	-
<u>Schemes not yet started</u>							
External electron beam	155	-	8	70	70	7	-
Canteen	50	30	20	-	-	-	-
Hostel and flats	150	-	50	50	50	-	-
Extension of laboratory accommodation	650	-	-	50	200	200	200
Minor works	-	30	50	50	50	50	50
<b>TOTAL BUILDINGS</b>	-	896	973	469	370	257	250
<b>TOTAL CAPITAL (gross)</b>	-	1,770	1,927	1,521	895	747	760
Shadow cut	-	- 210	-	+ 210	-	-	-
<b>TOTAL CAPITAL (net)</b>	-	1,560	1,927	1,731	895	747	760

NON CAPITAL

Salaries, wages, etc.	-	153	261	346	391	399	407
Administrative expenses	-	21	31	44	49	49	54
Stores, materials and services	-	176	345	465	555	605	675
University agreements	-	40	40	50	60	70	85
<b>TOTAL NON CAPITAL</b>	-	390	677	905	1,055	1,123	1,221
<b>TOTAL DARESBUY</b>	-	1,950	2,604	2,636	1,950	1,870	1,981

N.B. Expenditure on NINA in the above forecast includes a specific increase of 3% to allow for price level changes since the revised sanction.

Table 5

New Major Projects for High Energy and Nuclear Physics

(Summary)

	<u>Total Major Capital</u>	<u>1964-65</u>	<u>1965-66</u>	<u>1966-67</u>	<u>1967-68</u>	<u>1968-69</u>	<u>1969-70</u>
	£000	£000	£000	£000	£000	£000	£000
<u>Expenditure</u>							
Expansion of Rutherford Laboratory's Programme	-	-	-	230	440	640	830
Nuclear Structure Laboratory	3,900	-	810	1,390	1,650	1,230	820
Computer for Nuclear Physics	2,000	-	-	400	1,025	825	650
NINA Storage Rings	3,500	-	-	10	120	1,050	1,500
Major new U.K. Accelerator	21,000	-	-	-	-	-	10
Total Expenditure	-	-	810	2,030	3,235	3,745	3,810
Shadow cut	-	-	-	300	400	300	200
Total Expenditure (net)	-	-	810	1,730	2,835	3,445	3,610
<u>Staff</u>							
Expansion of Rutherford Laboratory's Programme		-	-	23	47	71	96
Nuclear Structure Laboratory		-	10	30	70	110	150
Computer for Nuclear Physics		-	-	5	30	50	70
NINA Storage Rings		-	-	-	5	25	35
Major new U.K. Accelerator		-	-	-	-	-	-
Total Staff		-	10	58	152	256	351

N.B. The total cost, timing and rate of spend of these projects are highly conjectural.



Table 5A

New Major Projects for High Energy and Nuclear Physics

Expansion at Rutherford High Energy Laboratory

	<u>Total Major Capital</u>	<u>1964-65</u>	<u>1965-66</u>	<u>1966-67</u>	<u>1967-68</u>	<u>1968-69</u>	<u>1969-70</u>
	£000	£000	£000	£000	£000	£000	£000
<u>Capital</u>							
Plant and Buildings	-	-	-	60	80	100	110
<u>Non-Capital</u>							
R. and D.	-	-	-	100	220	340	470
Bubble Chamber and Nimrod Operations	-	-	-	70	140	200	250
Total Non-Capital	-	-	-	170	360	540	720
Total Expenditure		-	-	230	440	640	830
<u>Staff</u>		-	-	23	47	71	96

Nuclear Structure Laboratory

	£000	£000	£000	£000	£000	£000	£000
<u>Capital</u>							
Double Tandem Machine	2,400	-	720	720	720	240	-
Building	1,500	-	50	450	500	400	100
Minor Capital	-	-	-	100	150	150	120
Total Capital	3,900	-	770	1,270	1,370	790	220
<u>Non-Capital</u>							
Salaries, etc.		-	15	40	90	140	190
Operating Budget		-	25	80	190	300	410
Total Non-Capital		-	40	120	280	440	600
Total Expenditure			810	1,390	1,650	1,230	820
<u>Staff</u>			10	30	70	110	150

Table 5B

New Major Projects for High Energy and Nuclear Physics (cont'd)Computer for Nuclear Physics

	<u>Total Major Capital</u>	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70
	£000	£000	£000	£000	£000	£000	£000
<u>Capital</u>							
Computer	1,750	-	*	250	750	500	250
Buildings	250	-	*	100	125	25	-
Minor Capital	-	-	-	-	-	50	50
<b>Total Capital</b>	<b>2,000</b>	<b>-</b>	<b>-</b>	<b>350</b>	<b>875</b>	<b>575</b>	<b>300</b>
<u>Non-Capital</u>		-	-	50	150	250	350
<b>Total Expenditure</b>		<b>-</b>	<b>-</b>	<b>400</b>	<b>1,025</b>	<b>825</b>	<b>650</b>
<u>Staff</u>		-	-	5	30	50	70

\* Token provision to permit normal capital expenditure proposal to Treasury

NINA Storage Rings

	£000	£000	£000	£000	£000	£000	£000
<u>Capital</u>							
Plant	2,000	-	-	-	50	550	750
Buildings	1,500	-	-	-	50	400	600
<b>Total Capital</b>	<b>3,500</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>100</b>	<b>950</b>	<b>1,350</b>
<u>Non-Capital</u>		-	-	10	20	100	150
<b>Total Expenditure</b>		<b>-</b>	<b>-</b>	<b>10</b>	<b>120</b>	<b>1,050</b>	<b>1,500</b>
<u>Staff</u>		-	-	-	5	25	35

Major New U.K. Accelerator

	£000	£000	£000	£000	£000	£000	£000
<b>Total Expenditure</b>	<b>21,000</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>10</b>



Table 6

Atlas Computer Laboratory

	<u>1964-65</u>	<u>1965-66</u>	<u>1966-67</u>	<u>1967-68</u>	<u>1968-69</u>	<u>1969-70</u>
	<u>Grant</u>					
	£000	£000	£000	£000	£000	£000
<u>CAPITAL EXPENDITURE</u>						
Schemes in progress	1,135	339	199	-	-	-
New schemes	127	400	290	300	80	90
<u>TOTAL CAPITAL</u>	1,262	739	489	300	80	90
<u>NON-CAPITAL</u>	386	525	652	698	721	787
<u>TOTAL EXPENDITURE</u>	1,648	1,264	1,141	998	801	877
<hr/>						
<u>STAFF in post at end of year</u>	60	100	105	105	105	105
<hr/>						

N.B. This forecast has not yet been approved by the Atlas Computer Committee

Table 7

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCEReceipts

	<u>1964-65</u>	<u>1965-66</u>	<u>1966-67</u>	<u>1967-68</u>	<u>1968-69</u>	<u>1969-70</u>
	£000	£000	£000	£000	£000	£000
<u>Rutherford Laboratory</u>						
Housing	16	17	17	17	17	17
Hostel	5	6	6	6	6	6
Restaurant	20	20	20	20	20	20
A.E.R.E. (Variable Energy Cyclotron)	50	20	-	-	-	-
A.E.R.E. (Mercury Computer Team)	5	-	-	-	-	-
Miscellaneous	5	5	5	5	5	5
	101	68	48	48	48	48
<u>Daresbury Laboratory</u>						
Canteen and Hostel	-	2	8	12	17	17
<u>Atlas Computer Laboratory</u>						
Charges for Atlas	80	200	300	300	300	300
<b>N.I.R.N.S. TOTAL</b>	<b>181</b>	<b>270</b>	<b>356</b>	<b>360</b>	<b>365</b>	<b>365</b>



Table 8

Effect of application to Institute staff of recentCivil Service non-Industrial pay settlement

	<u>1964-65</u>	<u>1965-66</u>	<u>1966-67</u>	<u>1967-68</u>	<u>1968-69</u>	<u>1969-70</u>
	£000	£000	£000	£000	£000	£000
Rutherford Laboratory	46	82	119	126	132	140
Daresbury Laboratory	5	15	27	32	36	41
Total nuclear physics laboratories	51	97	146	158	168	181
Atlas Laboratory	3	6	10	10	11	11
Total N.I.R.N.S.	54	103	156	168	179	192

N.B. The foregoing figures give the expected additional expenditure on salaries, superannuation and overtime for non industrial staff below banded level. The Civil Service pay settlement gave increases of 3%, 3½% and 3½% dating from 1st January, 1964, 1st January, 1965, and 1st January, 1966, respectively.