

PREM 19/1619

PART 2

M1

SECRET

CONFIDENTIAL FILING

Maintaining the Strength of the Science Base

SCIENCE AND TECHNOLOGY

The Science Budget.

PE 1: SEPTEMBER 1983

PE 2: AUGUST 1984

Referred to	Date	Referred to	Date	Referred to	Date	Referred to	Date
8.84		8.3.85					
8.84		15.3.85					
5.8.84		18.3.85					
7.84		19.3.85					
9.84		20.3.85					
9.84		22.3.85					
10.84		25.3.85					
10.84		27.3.85					
10.84		28.3.85					
10.84		29.3.85					
11.84							
28.11.84		ENDS.					
11.12.84							
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5.2.85							
22.2.85							
25.2.85							
26.2.85							
7.3.85							

PREM 19/16/19

PART 2 ends:-

Alun-Jones (Feranti) to Pm. 29.3.85

PART 3 begins:-

MEA note . 2.4.85.

TO BE RETAINED AS TOP ENCLOSURE

Cabinet / Cabinet Committee Documents

Reference	Date
MISC 110(85) 3	10/01/1985

The documents listed above, which were enclosed on this file, have been removed and destroyed. Such documents are the responsibility of the Cabinet Office. When released they are available in the appropriate CAB (CABINET OFFICE) CLASSES

Signed *J. Gray*

Date *9/4/14*

PREM Records Team

Published Papers

The following published paper(s) enclosed on this file have been removed and destroyed. Copies may be found elsewhere in The National Archives.

Cabinet Office: Annual Review of Government Funded R & D
1984. Published by HMSO, 1984. ISBN 0 11 630826 5

Signed

J. Gray

Date

9/4/14

PREM Records Team

FERRANTI

File EF

29th March 1985

The Rt Hon Margaret Thatcher MP
Prime Minister
10 Downing Street
LONDON
S W 1

R30 *EPS.*

Dear Prime Minister

Thank you for your letter of 19th March. I shall look forward to the meeting on 21st May.

I welcome the announcement of the new initiatives put out by the Department of Education and Science. My Company recruited 460 graduates last year so is vitally interested in the numbers produced.

While we have always thought that any major change in the ratio of science to arts graduates can only come from Government action, we recognise that there is a role for industry to play in their education and we wish to do all we can to help effect change in the present situation.

Yours sincerely

J D Alun Jones

J D Alun-Jones
Managing Director

Ferranti plc
Millbank Tower, Millbank, London SW1P 4QS.
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DEPARTMENT OF TRADE AND INDUSTRY
1-19 VICTORIA STREET
LONDON SW1H 0ET

TELEPHONE DIRECT LINE 01-215 5422
SWITCHBOARD 01-215 7877

JU216

Secretary of State for Trade and Industry

29 March 1985

The Rt Hon Michael Heseltine MP
Secretary of State for Defence
Ministry of Defence
Whitehall
London SW1

*Nb pm
MHA 1/4*

D Michael,

SKILL SHORTAGES

Thank you for your letter of 15 March.

will report if req.

2 I am glad to learn that you are prepared to provide, by re-allocating resources within your Department, up to an additional £1 million per annum over the next three years to increase substantially the number of university students you sponsor. I am sure that this will be a contribution towards the overall objective which we share, although I should not conceal the fact that I would myself have preferred an MOD contribution towards the switch, rather than further sponsorship. But I do not want to press the point: the important thing is that we are both pulling, in our different ways, in the same direction.

3 I am copying this letter to the Prime Minister, to the Chancellor of the Exchequer and the Chief Secretary, to the Secretaries of State for Education and Science, Scotland, Wales and Employment, the Minister without Portfolio, and to Sir Robert Armstrong and Sir Robin Nicholson.

*Yours
Norman*

NORMAN TEBBIT

01 APR 1985

9 11 12 1 2 3
8 7 6 5 4



PRIME MINISTER

THE EXPLOITATION OF RESEARCH COUNCIL FUNDED INVENTIONS

1. You asked me to reconsider my proposals for the arrangements to succeed the NRDC monopoly, to go further in the direction of devolving rights in research to the individual researcher; Mr Turnbull's letter to Miss Hodgkinson on 10 January records this. I have done so; and now resubmit the revised policy statement following, for your approval. Subject to your agreement I would aim to publish this shortly after Parliament returns from the Easter recess.

2. I find that at least two or three universities already have some arrangements on the lines you envisage. Because Council grants relate contractually to a university, not to an individual researcher, the extension to the researcher will need to be pursued through the university and within the framework of its general arrangements. Informal consultations by my officials confirm that universities are likely to welcome this extension.

3. There are two matters of accountability for which we must give clear and unequivocal policy cover. First, universities have been somewhat uncertain about using UGC money for activities to promote exploitation and liaison with industry, such as the appointment of liaison staff or the purchase of expertise. Paragraph 10 of my statement is intended to reassure them that we regard such infrastructure expenditure as consonant with the role of a university and an acceptable use of UGC funds.

4. Secondly, in moving from a monopoly situation to one of probably great variety and widely distributed responsibilities there may be greater risk than under the old arrangements that some good discoveries may be lost or under-exploited. We just cannot be certain. I believe that as things develop we shall get more and better exploitation through greater opportunity and motivation. But we owe it to the research constituency to recognise this risk, and to affirm our policy none the less robustly, against possible PAC criticism. I seek to do this in paragraph 13.

5. You will also note that I propose that the NRDC monopoly should end from the date of my statement, to restore some of the momentum and enthusiasm for this change. This may mean we have a somewhat untidy few months while universities are developing their ideas and submitting their arrangements for approval - but I think the risk worthwhile.

6. Peter Brooke has pointed out that the new freedom for universities will be a golden opportunity for existing private institutions to move into this area, or for a new one to be established, with national benefit. I therefore intend to make the announcement widely known, especially to City institutions; and thought it right to copy this submission to the Chancellor of the Exchequer and the Governor of the Bank of England; also to Norman Tebbit, Peter Rees, Sir Robert Armstrong and Sir Robin Nicholson.

KJ.

29 March 1985

POLICY STATEMENT BY THE SECRETARY OF STATE FOR EDUCATION AND
SCIENCE

THE EXPLOITATION OF RESEARCH COUNCIL FUNDED INVENTIONS

1. The Government wants to encourage the fullest possible industrial and commercial application of UK scientific and technological discoveries for the maximum benefit of the UK economy. In 1985-86 we shall spend, through the Grants-in-Aid to the five Research Councils, some £560M on civil scientific research; and, in recognition of the long term importance of research for the country, the Government's recently published expenditure plans for the years 1985-86 to 1987-88 make additional provision, compared with earlier plans, of some £18M in all over the three years for the enhancement of equipment in carefully selected university centres of high quality research and some £27M for the Science Budget to assist the Research Councils in restructuring and redeployment and to fund more research grants of highest quality.

2. Following the Prime Minister's announcement of the ending of the right of first refusal held by the British Technology Group for the exploitation of Government-funded research, with the aim of enlarging opportunities for exploitation especially for scientists who want to exploit their own work, the Department has had extensive discussions with the Councils and others concerned. I am now able to announce the main features of the new arrangements.

3. The Government's overall aims in the new arrangements are to increase the exploitation of research funded by the Councils, for the maximum benefit of the UK economy; to strengthen and improve exploitation, through freer competition between exploiting agencies in the public and private sectors and in other ways; therefore, to place responsibility and initiative for exploitation as fully as possible on researchers, their institutions and the Councils, consistent with their legal responsibilities; and to increase the incentive for researchers and their establishments by enabling them and the work that they do to benefit

from increased exploitation. We want researchers to be alert to the possibilities for exploitation of their work; to see and share in the benefits of exploitation both for their own establishments and more widely in the national interest; to have access to arrangements for exploitation as simple and effective as practicable; and, where it is appropriate and they wish to do so, to have the opportunity to pursue exploitation themselves.

4. This statement mainly concerns universities. I envisage that the same principles should apply for local authority institutions of higher education, and appropriate parallel arrangements be developed in due course.

5. For the research they support in universities the Councils - who between them are currently funding some 6,900 research projects of total value of £360M - would, I understand, wish the rights and responsibilities for exploitation to rest with the institution in receipt of grant, where the university wishes to hold them, and where the Councils are satisfied that adequate arrangements and procedures exist for identifying and pursuing potentially exploitable results. On behalf of these Councils and with their agreement, the Chairman of the SERC will shortly be writing to Vice-Chancellors to propose this transfer and to invite them to state their university's wishes.

6. It will be open to universities to propose what arrangements best suit their circumstances. In considering these I hope universities will seek to give the fullest opportunity and scope for researchers themselves, where they wish to do so, to assume responsibility for exploiting their own findings and ideas, with commensurate share in the benefits. I envisage that the opportunity to exploit would thus in the first place rest with the researcher, on the understanding that he or she would take active steps to exploit the ideas, in ways consistent with the Government's policy aims and within the framework of the university's agreed arrangements. These arrangements will need to have regard to the university's terms and conditions of service; and, because public funds are involved, the university should share in royalties and provision should be made for periodic reporting. I hope that universities will encourage researchers to exploit discoveries themselves and will provide guidance

and help for those who wish to do so. Where a researcher nevertheless chose not to take on the rights and responsibilities for the exploitation of his discoveries, these would revert to the university.

7. Whether the discovery is exploited by the university or by the researcher it would be open to them to retain the rights themselves, to set up a limited company for the purpose, or to negotiate terms for transfer of the rights and responsibilities for exploitation to intermediaries such as private sector organisations or to the BTG. Or they may choose to enter into direct agreements with industrial and commercial companies for the exploitation of individual discoveries, seeking such professional or other services as they need; or conclude agreements with the private sector intermediaries to undertake this on their behalf.

8. The Government does not wish to prescribe the means of exploitation; but it will want to be satisfied that there are considered arrangements governing exploitation by the university or by individual researchers, to safeguard the public interest in the monies involved while maximising the possibility that good inventions will be identified, assessed, protected and exploited.

9. Universities will be invited to submit an account of their proposed arrangements for the exploitation of inventions to the SERC which will arrange for them to be considered in consultation with the other Councils, the CVCP, the UGC and with the Department of Education and Science, the Department of Trade and Industry, and HM Treasury. When arrangements are agreed and in place Councils would thereafter regard the university as fully responsible; and would wish to receive a brief annual report from each institution on the working of the arrangements in respect of their grants and contracts, including information on income earned. Any proposed major changes in the agreed arrangements will be subject to the same process of consideration and approval. I shall also be asking the Councils, in conjunction with other interested bodies, generally to review the overall arrangements when sufficient experience has been gained of their

operation, perhaps after three years.

10. It would be for the university or the researcher to negotiate exploitation terms. Universities will be able to retain their share of royalties and receipts in full without loss of general or specific grants. I hope that they will see fit to use them to strengthen and improve their research capability, its further exploitation, and related infrastructure. Where a university chooses to establish such necessary infrastructure, the Government would regard related expenditure as a proper use of an institution's resources, in recognition of the role of universities and other institutions of higher education in collaborating with industry and promoting exploitation.

11. I am asking each Council to amend its conditions of grant to accommodate the new arrangements; and am inviting them to consider the scope for developing their own policies for exploitation of inventions originating in their own Units and Institutes on similar lines, so as to provide the maximum involvement of researchers and their establishments where appropriate, having regard to Councils' financial and legal responsibilities and to the efficient use of a Council's experience and expertise. The present delegated authority controls governing Councils' involvement in commercial enterprises will be phased out as soon as each Council is ready to take on its responsibilities fully. They will be able to retain earnings from exploitation of their in-house inventions without loss of Grant-in-Aid. When sufficient experience has been gained the Department will wish to review the workings of the new arrangements with the Councils.

12. The intention of these changes is to benefit the UK; and it is important that the exploitation of our scientific and technological discoveries should whenever possible be done by UK companies. This aim will be borne in mind when considering proposals from universities for the new arrangements. There may be circumstances where a foreign company or a subsidiary of such a company is the best choice, whether as an intermediary or for the negotiated transfer of rights. Where a university

or researcher is considering using such a company or subsidiary for all of their discoveries, or all discoveries in a particular discipline or field, the university's arrangements should provide for the Department of Trade and Industry to be consulted at an early stage. The Department of Trade and Industry will also be ready to advise in particular cases and I hope that universities and researchers will consult them freely. The annual reports which universities make should record any agreement for exploitation made with an overseas company or a subsidiary.

13. There is a nice balance to be struck between the free flow of information on which the health of science so critically depends and the need to protect new inventions if they are to be fully exploited to the benefit of the UK. A balance is also required between the freedom and motivation of the researcher to pursue exploitation, the efficient use of negotiating and other commercial skills to secure the best terms, and the legal responsibilities of Councils, universities and their employees. In seeking to give the individual researcher greater scope and opportunity to exploit their inventions there is a possibility that in particular instances exploitation will be less than optimal. But the Government believes that it is right to incur this risk to secure the gains that will come from giving researchers and their institutions more responsibility and more incentive. It is confident that the scientific community, through consultation between the Councils and the universities, will be able to work out satisfactory arrangements that will meet the Government's aims.

14. The new arrangements will take effect from today and will apply to all discoveries made hereafter whether funded by Councils' current or future grants and contracts. There will necessarily be a transitional period, which I hope will last no more than six months, while universities are considering their arrangements and agreeing them with the Councils as described above. The Research Councils have agreed that, during this time, a university with a proposal for exploitation should in the first instance consult the Council responsible for the grant; Councils will be informing their grant holders accordingly.

Science & Tech. : Science Budget A2.

02 APR 1985

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6 7 8 9 10 11



FROM PETER LAISTER
CHAIRMAN & CHIEF EXECUTIVE

PPS
229
THORN EMI

THORN EMI House
Upper Saint Martin's Lane
London WC2H 9ED
(Main entrance in West Street)
telephone 01-836 2444
telex Thorn London 24184/5

28th March, 1985.

The Rt. Hon. Margaret Thatcher, PC, MP,
10 Downing Street,
LONDON, S.W.1.

Dear Prime Minister,

I was extremely interested to receive your letter of March 19th and to read of the new initiative being introduced by the Government to increase the output of engineering and technology graduates. This company would certainly wish to play its part in supporting this very essential programme.

I am therefore looking forward to attending the meeting on Tuesday, May 21st, and your office was duly advised.

Yours sincerely

P. Laister

PL/JSO.

2CF
RS/4
File

THE GENERAL ELECTRIC COMPANY, p.l.c.

PLEASE REPLY TO: HIRST RESEARCH CENTRE, EAST LANE, WEMBLEY, MIDDLESEX, HA9 7PP

TELEPHONE: 01-904 1262

TELEGRAMS: RESEARCH, WEMBLEY

TELEX: 923429

28th March 1984

The Secretary
The Prime Minister
10 Downing Street
London SW1

Dear Sir

With reference to the Prime Minister's letter dated 19th March on the output of graduate engineers and technologists, I am writing to confirm that I can attend the meeting on Tuesday, 21st May.

Yours faithfully

Robert Clayton

R J CLAYTON

Office of the Chairman

Rank Xerox Limited
338 Euston Road
London NW1 3BH
Telephone 01 380 8000

R29 PPS

RANK XEROX

The Office of The Prime Minister,
10 Downing Street,
London SW1

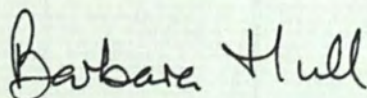
27th March 1985

Dear Sir,

In Mr. Orr-Ewing's absence, I am writing to confirm that he will be pleased to attend the meeting on 21st May referred to in the Prime Minister's letter of 19th March.

Prior to that meeting Mr. Orr-Ewing will write to the Prime Minister to set out what we do now, and in what areas we will be able to provide support for any initiative the Government may take in this field.

Yours faithfully,



Mrs. B. Hull
secretary to Mr. H. Orr-Ewing

CF
129

From
J. H. Harvey-Jones, MBE
Chairman

Imperial Chemical Industries PLC

Imperial Chemical House
Millbank London SW1P 3JF

Telephone 01-834 4444

129
27th March 1985

The Rt Hon Margaret Thatcher MP
10 Downing Street
London SW1

PPS
Will

Dear Prime Minister,

Thank you for your letter of 19th March and the invitation to join your meeting on Tuesday, 21st May, at 10.00 am in 10 Downing Street.

I would of course be very happy and honoured to attend and do my best to contribute to your discussion.

Yours sincerely,

John Harvey-Jones

Lucas

Lucas Industries plc
Great King Street
Birmingham B19 2XF

Chairman

Telephone: 021-554 5252
Telex: 338681

The Rt Hon Margaret Thatcher MP
Prime Minister
10 Downing Street
LONDON SW1

27 March 1985
GM/PP

R28. ~~PP~~ CF?

File

Dear Prime Minister,

Thank you so much for your letter of 19 March on the subject of increasing the output of graduate engineers and technologists. I agree with you that the solution to this problem is a vital step towards under-pinning the economic recovery of the manufacturing industry in this country.

I look forward to meeting you and your colleagues at No.10 Downing Street on Tuesday 21 May at 10.00 hours.

Yours sincerely

Godfrey Messervy

GODFREY MESSERVY



**STANDARD TELEPHONES
AND CABLES PLC**

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190 STRAND
LONDON WC2R 1DU
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R28
CF

**CHAIRMAN AND CHIEF EXECUTIVE
SIR KENNETH CORFIELD**

27th March, 1985

The Secretary to
The Prime Minister,
10 Downing Street,
London, SW1

Dear Secretary,

This is to confirm that Sir Kenneth will
attend the meeting arranged for Thursday, 21st May,
at 10 am with the Prime Minister and Sir Keith Joseph.

Yours faithfully,

L.E. Archer (Miss)
PA to the Chairman



Chairman's Office

TI Group plc

50 Curzon Street
London W1Y 7PN

telephone: 01-499 9131
telex: 263740

R25
CF

27 March 1985

Private Secretary to
The Prime Minister
10 Downing Street
Whitehall
LONDON SW1

Dear Sir

I am writing to confirm that Mr R E Utiger will attend the Prime Minister's meeting on Tuesday, 21 May, at 100 hours in No 10 Downing Street.

With reference to the invitation list which you sent separately, you may like to know that Mr Utiger became Chairman of TI Group plc in May 1984.

Yours faithfully

Mary S Christie (Miss)



FILE

87

10 DOWNING STREET

From the Private Secretary

27 March, 1985

MEETING OF INDUSTRIALISTS, 21 MAY, 1985

I attach a copy of a letter from Sir William Barlow. He will be unable to attend the meeting, but has suggested some more names to be added to the list. I should be grateful for advice on his ideas, though it does seem to me that it could be awkward now to start adding extra people to the original list, particularly in view of the fact that we have had a good response so far.

brf

(Mark Addison)

Miss E Hodkinson
Department of Education and Science

6



DA

CF Meeting on
21.5.85

10 DOWNING STREET

From the Private Secretary

27 March 1985

||

The Prime Minister has asked me to thank you for your letter of 26 March. She is sorry you will be unable to attend the meeting on 21 May, though she looks forward to receiving any comments you may wish to make beforehand.

(Mark Addison)

A. Poot, Esq.

eu

fat. c.f. pps
010

chairman & managing director

PHILIPS



arundel great court
8 arundel street
london wc2r 3dt

26th March, 1985

The Rt. Hon. Margaret Thatcher, PC
Prime Minister,
10 Downing Street,
London, SW1

Dear Madam,

Output of Graduate Engineers and Technologists

Thank you very much for your letter of 19th March on the above subject, and your invitation to the meeting on 21st May.

I very much regret that I cannot attend the meeting on that date as I will be abroad on a long-standing business trip. I would, however, like to have the opportunity to comment on these important issues raised in your letter and with your agreement I will write to your office in advance of the meeting.

*Yours,
A. Poot*

A. Poot



d/f

10 DOWNING STREET

From the Private Secretary

26 March, 1985.

The Prime Minister has asked me to thank you for your letter of 22 March. She is sorry you will be unable to attend the meeting, but she has noted the point you make about the important roles schools can play in this area.

(Mark Addison)

Philip Hughes, Esq.

da

510
British Aerospace
PUBLIC LIMITED COMPANY

100 Pall Mall
London SW1Y 5HR

Telephone: 01-930 1020
Telegrams: Britair London
Telex: 24353

From the Chairman,
SIR AUSTIN PEARCE, CBE

The Rt Hon Margaret Thatcher, MP,
Prime Minister,
10 Downing Street,
London, S.W.1.

CF
25th March, 1985. J27

Dear Prime Minister

Thank you for your letter of the 19th March on the subject of your meeting on Tuesday, 21st May.

I was scheduled to be addressing a meeting of our employees that morning, but I have been able to reorganise that and am now pleased to accept your invitation.

It so happened on the afternoon of the day on which I received your letter, I was addressing a conference of the Council of University Administrators on the subject of your meeting, and although I am sure you will not have time to read it, I enclose a copy of what I said, which deals with some of your questions and which might be of some assistance to your staff.

Yours sincerely,

Austin Pearce

Encl:



CF papers

BICC plc

P.O. Box 5 . 21 Bloomsbury Street . London WC1B 3QN . England

Telephone: 01-637 1300 - Telex: 628811 BICC G-Station Code BIGHO

Your Ref:

Our Ref:

Sir William Barlow F.Eng.
Chairman & Chief Executive

Principal Private Secretary to Prime Minister
Mr F. E. R. Butler
10 Downing Street
Whitehall
LONDON SW1

25 March 1985

Dear Mr. Butler

MEETING ON MAY 21, 10 DOWNING STREET, IT EDUCATION

Unfortunately, I am unable to attend the meeting to which I received an invitation but this letter is on another aspect of it.

On looking down the list of people invited, I was disappointed to see that the National Electronics Council was not represented. This Council has spent a lot of time and effort working with the Electronics Industry to see how best to tackle the IT skills shortage. In fact, the Council prepared a lot of information which is now being widely quoted. The Chairman of the Council is HRH The Duke of Kent and the Deputy Chairman is Mr John Whyte, Chairman of Plessey Telecommunications. I strongly recommend that one or other of them be invited to attend The Prime Minister's meeting.

Another omission which I notice is Sir Henry Chilvers, Vice Chancellor of Cranfield who is the organiser of the plan to start an Information Technology Institute in which many of the other Chairmen on the list are themselves involved. I would have thought Henry Chilvers could have made a very useful contribution to this meeting.

*Yours sincerely,
William Barlow*



BICC plc

P.O. Box 5 . 21 Bloomsbury Street . London WC1B 3QN . England

Telephone: 01-637 1300 - Telex: 628811 BICC G-Station Code BIGHO

Your Ref:

Our Ref:

Sir William Barlow F.Eng.
Chairman & Chief Executive

FILE + BF after meeting

The Rt. Hon Margaret Thatcher MP
The Prime Minister
10 Downing Street
Whitehall
LONDON SW1

27
25 March 1985

Dear Prime Minister,

Thank you for your letter of 19 March inviting me to a meeting in 10 Downing Street on 21 May to discuss IT education.

This is a subject in which I have been deeply involved in the last few years and where I very much want to see and encourage new initiatives. It is, therefore, with great disappointment that I have to say I am unable to attend because it is in the middle of a two week business visit to Australia.

I shall look forward to hearing about the meeting in due course and I am sure it will generate very useful discussion.

BF1

*Yours sincerely,
William Barlow*



Chairman's Office

ROLLS-ROYCE LIMITED

65 Buckingham Gate, London SW1E 6AT, England

Telex: 918091

Telephone: 01-222 9020

March 25, 1985

The Rt Hon Margaret Thatcher MP
The Prime Minister
10 Downing Street
London SW1

Dear Prime Minister,

Thank you for your letter of 19 March inviting me to attend a discussion on 21 May.

I shall be happy to do so.

*Yours sincerely,
Francis Tombs*

Sir Francis Tombs

Handwritten initials or mark.



CF R26

SYSTEMS DESIGNERS INTERNATIONAL PLC

Pembroke House, Pembroke Broadway, Camberley, Surrey GU15 3XD, England
Telephone Camberley 686200. Telex 858280, Telecopier Camberley 683511

The Prime Minister,
10 Downing Street,
Whitehall,
London, S.W.1.

Handwritten notes: CF, GR, for filing pl., CR.

25th March 1985.

Dear Prime Minister,

Thank you for your letter of 10th March. As you will appreciate, the output of graduate engineers and technologists is of great interest to my company, and I would be delighted to discuss this with yourself and your colleagues on 21st May as arranged.

I look forward to meeting you then.

Yours sincerely,

Philip Swinstead,
Chairman.

CONFERENCE OF UNIVERSITY ADMINISTRATORS
FRIDAY, 22ND MARCH, 1985 AT GUILDFORD CATHEDRAL

'THE NEEDS OF INDUSTRY - WHAT ARE THEY ?'

About four weeks ago I was asked if I would give this address, but it was much later before I was able to study the content of your conference and then I realised how all embracing are the subjects which you are discussing. If I had been sharp enough I should have asked for the programme first, in which case I might have suggested that I should attend the sessions on "Public Speaking made Easy" and then all would be revealed, but I didn't. I have also to admit that no one has ever asked me to read a lesson in a Cathedral, let alone give an address, and so today I feel a bit like a new M.P. about to make the maiden speech in the House of Commons, somewhat overawed by the surroundings and recognising that my audience knows far more about the subject than I do, and has heard most of it before expressed in a wide variety of ways.

To prepare the type of presentation appropriate to this audience would normally justify months of in-depth research. In my case this was not possible, so it is a distillation or condensation of many conversations with a wide variety of people in industry, commerce and the civil service. Whilst most of the words are my own, many of the comments I make are quite strongly felt by a wide cross-section of management, but naturally not all, and the wide spectrum of views is one of the major problems, but not serious enough to stop us from tackling them.

I have taken as the title for this address 'The Needs of Industry - What are they ?' This title alone contains at least one other question in it and if I can revert to my University days and quote one Dr. Joad, I am sure he would have said "It all depends upon what you mean by Industry" and to that there are a multitude of answers. The general title of industry covers companies ranging in size from a turnover of a few thousand pounds per year to a few billions of pounds. The company may be in an extractive business such as oil, manufacturing such as aerospace or a service industry such as banking. As I have been involved in all three of these industries let me take my experience in them as the basis of my comments.

In all of them I would suggest that the biggest problem they have is "people". The cost of the human resource is in general one of the largest cost centres and one of the most difficult to control and to determine. The human unit is also the most unreliable and unpredictable. This seems a rather damning indictment until one puts along with it the fact that the human unit is the most complex, adaptable and productive unit if used properly, of all industrial resources.

So what skills is industry looking for and you will know as well as I that each industry and even each company looks for something different. The fact is, I think, borne out by the ^{perceived} characteristics of the three major oil companies' personnel.

Esso have been described as the engineers - with every problem out comes the slide rule, or pocket computer and everything is converted into figures or charts.

Shell are the diplomats and Shell is one of the very few truly international companies as distinct from a company which is involved in international business.

B.P. are the gentlemen amateurs but probably the world's most effective company in discovering oil.

Companies, of course, change and the above description is some years old but demonstrates my point that there is no one answer to the question.

Might it be possible to create something approaching one answer, the French seem to have done it and it looks very much as if the Japanese have done it, so can we? Regrettably I have to say, I doubt it, at least for some time and the reason I believe is bound up with the very limited mobility between the three occupational streams of Government service, the professions in which I include commercial services and industry, both manufacturing and extractive.

I have been fascinated by the number of top French and Japanese industrialists I have met who have had executive positions in all three of the streams I have mentioned, they are in a clear majority. In the U.K. the number of civil

servants who have transferred to line industrial management is minimal, there is no shortage of non-executive directors or ^{non-exec} chairmen but very few executive and an even smaller number of industrial executives who have joined the civil service. Attempts have been made with one particular effort having been made quite recently in the Ministry of Defence, but the bureaucratic machine has been very effective in slowing progress to an absolute crawl and very little interchange has taken place so far. I hope that will change.

Industry itself cannot be blameless in this particular saga and to me the problem is usually created by the inability or unwillingness of the management to plan ahead more than one move. In my view to suggest to any individual who has any intelligence that he or she should move from one career structure to another and just hope that there will be a return job available at the appropriate time is stupid. Changes in career paths should be with a particular object in mind and should be planned with great care and with at least two steps in mind with a fall back position if the programme goes wrong. It is management who created the move in the first place and they must take the responsibility for dealing with the results, good or bad.

But to return to my theme, with our three streams, created I suggest by history and our social prejudices, to whom does the University system turn for its' guidance.

On the face of it you could turn to the Department of Education but when the prime industrial contacts are spread between the D.T.I., the Dept. of Energy and the Dept. of Transport it's highly unlikely that Education will get any really coherent let alone consistent view.

So what about the employers organisations such as the C.B.I. or Chambers of Commerce? Possibly a little better but if one is privileged to listen to the debate in their committees, the range of views is amazing, between the large

and small companies, the hi-tech and low tech companies, the sunrise industries and those which have at least reached hi-noon. It is also I have to say, not all that different when one starts discussing these types of problems in the Trade Associations and some of the combined learned bodies.

So where does this leave us ? it's not particularly helpful to be negative and knock down everything, what is the constructive and positive approach ? I suggest one answer is for the contacts between the universities and industries to be more regional and local. We have to recognise we are dealing with people and if we can take a leaf from the industrial relations book it has tended to be much more successful when tackled on a limited area basis than centrally.

Lines of communication are shorter and tend to be better and individuals tend to be prepared to meet rather than conduct their activities through correspondence.

There are, of course, snags, the regions are not all equal in size, in industrial concentration, in financial viability and other factors which I am sure you can all work out for yourselves. There could be a tendency to be parochial and somewhat inbred with limited effort to attract students from elsewhere or to provide students to companies outside the region. It could also act against the development of centres of excellence, so what I have suggested is not the panacea for all ills if universities are going to find out what industries are looking for and produce the graduates with the right disciplines at the right time but I suggest the shorter the communication loops the greater the chance that we will get things better than they are today.

It has to be recognised that in some respects industry has a short time horizon. It may be involved with projects which take years to come to fruition but it is judged by its

performance on a yearly or half yearly or even quarterly basis whereas the production of a graduate takes at least three years after the curriculum has been decided, the staff have been found and also but not least, the money has been granted to launch the course.

on reduction

Reconciliation/of this time differential is a key to matching of supply and demand and so anything which can be done to reduce it will, I believe, be to the benefit of both universities and industry.

Where, however, does this leave the Dept. of Education and the U.G.C. ? In some respects it puts them into an easier position and at the same time puts the pressure on them for quicker decisions and that usually means less bureaucracy and lower costs of administration. Neither of these will be particularly welcome ideas to those who administer the present system but it could improve the educational value for every pound of the taxpayers contribution.

I would not be surprised to hear that what I have been saying is already practised in some regions of the country, probably many but the questions is whether the thoughts and ideas get to the centre and more important, are recognised and also that the local industry welcomes and supports this type of initiative.

This recognition and understanding of what we are trying to achieve is a very common problem. I well remember the announcement of the first U.G.C. cuts of a few years ago. I happened to be lunching with the Secretary of State for Education and he repeated the Governments' philosophy of encouraging technical education and meeting the needs of industry and I felt very encouraged until I saw where the cuts had fallen and I wondered if at that lunch we had been talking about the same problem.

But what is industries problem, what is the scale of it and how can it be corrected ?

Regrettably I only have a very limited amount of data and this demonstrates the first problem or set of problems. Too many companies only think of their requirements just before they start recruiting, and sometimes with no clear view of what they will do with graduates if and when they get them and as pressures grow to reduce overhead costs, to become more competitive to get the profit today, this problem may, and I only say may, get worse and some companies will need help and the local organisation is best placed to do this if it wants to.

The second part of this problem is that some companies are reluctant to give out the information. Some of the information I have has been given on the basis that if I use it, no company names are mentioned and this just highlights the problem of determining the scale of what we need to achieve.

So let me quote some of the comments made and as the extracts are taken from a variety of sources and are all mixed up I trust I will breach no confidences. First, some views on recruiting itself:-

- (A) "We are shortly trying to recruit highly qualified personnel of various disciplines by national advertisement. This will be the first time in a number of years because we have been contracting and therefore able to satisfy most of our needs from the university output alone. As such I am unable to provide you with useful facts/figures, although I can endorse your perception of specific scarce skills where we expect to encounter difficulties. We are nervous about the success of our attempt knowing that in remuneration terms we are able to attract freshly graduated engineers,

but that the experienced man of five years may be out of our reach."

- (B) "Advertisements seem to net little or no response. A recent advertisement in the Daily Telegraph for a microwave engineer - no replies were received. The cost of advertising was in the region of £7000."
- (C) "I further believe that there is unwarranted concentration currently on the provision of new post graduate courses - this is not an area of real need."

Now some views on how short the companies are:-

- (D) "Our current vacancies stand at 150 compared with 140 a year ago, but some of these so-called vacancies represent recruitment targets which make some allowance for anticipated losses. Graduate turnover is in the range 10 - 12% (annual). In addition to the vacancies stated above, we have a recruitment target for 95 new graduates."
- (E) "Average turnover of all engineering staff is approximately 8% per annum, but turnover of software engineers and system integration specialists can be as high as 30% per annum. Losses include young newly trained specialists and they are often recruited away from the aerospace business."
- (F) "In 1984 we lost by wastage (for all reasons) 450 staff in the high technology skills employed in the technical directorates."

Now what sorts of disciplines:-

- (G) "Prime areas of needs are avionics, stress, aerodynamics, aircraft systems, electronics and specialist design.

There are difficulties in recruitment, even where we offer training in new technologies, especially in the graduate area, where the output of academic institutions is not balanced with needs of industry."

- (H) "Our particular requirements for experienced graduate engineers are as follows:-

Electronic engineering, including digital and analogue circuit design, ground test systems, factory automation, and hardware interfacing techniques.

Systems engineering, including electro-magnetic compatibility, mathematical modelling, servo systems, and data transmission systems.

Computing, including systems analysis, networking, and real time software for avionic systems.

Structural and stress engineering.

Currently short of 60 engineers (7%) all types. Half of these are electronic engineers mainly digital but also analogue and RF which are the most difficult.

Other problem areas are software and systems engineers.

Difficult to recruit good production engineers because of lack of glamour as a technology."

- (I) "Graduate engineers are in critically short supply in the following disciplines:-
Electronic - particularly with systems experience.
Microwave.
Software.
Production with sound practical experience.
We conduct extensive training to ameliorate the shortage, e.g. convert physicists to electronics, train 'A' levels to software support roles, train microwave technicians etc."
- (J) "We meet the bulk of our needs for qualified personnel by in-house training of recruited graduates and sponsored students.
We currently have around 1,000 qualified scientists and engineers in R and D/production/management services/quality etc.
We see an increasing need for qualified staff and the company's planned graduate intake for 1985 exceeds 80 compared with an average intake of 25 - 30 in recent years. There is a growing emphasis on electronics engineers, manufacturing systems engineers and computer specialists.
Retention is a serious problem with graduates having 2 years' plus experience. In common with other large organisations we train and then lose a high proportion - during the last 5 years we have lost around one third of our recruits. Adjusting salary scales to offer the necessary progression causes serious problems in internal relationships."

(K) "We currently have vacancies for 35 engineers in a variety of disciplines and have had a significant requirement for the last 5 years. Particular difficulties are experienced in the recruitment of mechanical engineers in the design, development and technical departments. Extensive advertising campaigns in the National, Local and Trade Press have failed to produce a sufficient supply of degree standard qualified staff with any experience of the aerospace or related industries."

Finally, just one quote from my own Company:-

(L) "During 1984, we spent at a rate of £100,000 per site on advertising and agency fees. While we managed to attract junior people, the experienced engineer is scarce, particularly:-
Stress engineers
Power plant engineers
Aerodynamicists
Analyst/programmers."

That quote above means that British Aerospace has spent some £2m in advertising for graduates with only limited success. Personally I am very sceptical of the value for money from advertising. I would rather spend the money on training, but is the package there which will attract my management ? The advertising facility certainly is, but there are many doubts about the training facility.

I could go on with a lot more quotes, but I would just be repeating what you have already heard. If, however, I add together the figures in all the replies I have seen, it adds up to about 1500 engineers short at this time in the aerospace industry which employs about 200,000 people in total. Not a very high proportion of the total staff, but at least 5% of the graduate population in the industry.

I am sure you will not have been surprised to hear the figures of 8% per annum wastage for graduates and up to 30% per annum wastage for systems people. In the aerospace industry undoubtedly the emphasis is moving away from the mechanical bias towards the electronic bias. There is, however, a shortage of aerodynamicists and stress engineers, and this too is not all that surprising. We have only

one major airframe manufacturer in the U.K., namely British Aerospace. There is, of course, Shorts but a significant part of their work is sub-contracting from such companies as Boeing who have their own design staffs. It is also probably true that between now and the end of the century at most there will be two new airframe designs so what is the future for the young aerodynamicists? Are they going to see the stop/go or feast/famine history of the aerospace industry of the 60s?

This statement demonstrates just another of the problems met when trying to predict industries needs and that is the speed of change of the market both in volume and performance requirements. Economic situations change, market interests change. How many for example would have predicted just say, two years ago, the sudden down turn in the home computer market. Who would have predicted the massive reduction in car requirements in the States or the great infiltration of Japanese products. These factors and many more, clearly affect the demand for and disciplines required in the work force and industrial management is not all that good at predicting these changes, the more so when most of their time is spent on the problems of today rather than tomorrow. Those companies which have an above average record in predicting and adapting to the future tend to be those which are prepared to consult with and be advised by outside organisations. Quite often these are the professional consulting companies and the business schools, it is my belief that there are significant opportunities for the academic world to have a greater influence in this field but the initiative has to come from the universities and they must not get too frustrated too soon. I know it will be far from easy, but nothing will happen if a start is not made.

Comparable problems can be seen in the oil industry. In the early 70s civil structural engineers were desperately needed for the building of the massive 360,000 ton North Sea production platforms. Today, I believe every one of the U.K. fabrication yards based on concrete is shut down. In the years immediately prior to the 73/74 crisis, Esso in the U.K. was planning massive orders for VLCCs - 250,000 DWT Tankers. I alone was involved in the contracts for eleven of these, today I believe Esso U.K. has at most two left. In the expansion period of the late 60s, refineries were springing up all over the place sucking the mechanical and chemical engineers into Stanlow, Milford Haven, Isle of Grain and in many places in Europe. Today, many of those refineries are scrap heaps, if they still exist.

Banking, too, is going through its revolution, progressively more and more of the data and information is going on to tape rather than paper, and instead of the manpower intensive clearing system, we have the automated clearing system, in effect a highly complex data transmission system. The plastic card is with us and today one often sees queues outside a bank waiting for the automatic dispenser, whilst inside the teller has few customers and many of the positions are closed.

In the time available to me for the preparation of this address I have not been able to obtain anywhere near enough data to quantify the needs of even the three industries I have described nor to be more specific about the disciplines needed but all are indicating shortages and this is borne out by some of the C.B.I. surveys. One thing is clear, companies are recognising the need to improve the quality of management at all levels down to the first line supervisor and in particular to make them more numerate. However, this does not decrease in any way the need to understand the business and so experience is also vital. Many of the quotations I gave, emphasised the shortage of experienced personnel and this includes people who have been around only 2 years or so.

All of these changes mean two things; the first is that industry is requiring new and different skills, but also that it is in general needing fewer people per production unit, and it is this point which is raising a major problem for the U.K.

The majority of companies in this country of any size have a wide age distribution from at least 20 to 60 years. Within that population there are many people who are in their 30s with, say, 10 years of experience and know the business, but have not been trained in the latest techniques. Unless they can be re-trained, many of them will become redundant. Making them redundant is itself expensive; redundancy loses all the investment which the company has put into the individual in training and experience, and as the individual probably has a family, the costs to the State are quite significant.

So, for purely economic reasons this nation has a major justification for re-training the individuals I have mentioned. It also has major social reasons which are extremely important, but I will put these on one side for the moment.

But who is going to train these individuals? You might remember in my quotations, several which referred to in-house training and the shortage of experienced personnel. Training of the 30 year old is, however, a much more difficult activity than training a virile 20 year old with no family ties or worries. Such training requires first class teachers and I do not believe there are a large number of such experts within industry, but there are in the universities. Industry is unlikely, however, to release their experienced managers for a two or three year course, and the courses have to be tailored very much to the local need. The wife is also not likely to take kindly to her husband being miles away for months on end.

If we put these facts together we see a group of people who can only be released from their jobs for say, 3 months, are somewhat out of the habit of learning and who, because of family ties, cannot be away from home for too long spells. Therefore, a quite different type of course is required from that given to the newly arrived undergraduate and there will not be that degree of commonality of training which pupils get by taking 'A' levels, etc. It is, therefore, I suggest, a more complex problem which will probably require quite different techniques from those normally used. I understand much work has been done in some of the universities, I also know that the majority of industries do not really know what is available and yet this is so much a matter of communication and selling the wares available.

So back I come to my thesis that a much closer bond at the local level between companies and universities is one of the mechanisms for the better matching of skills or needs.

But how is this to be achieved? Well, the answer is, by a lot of hard work. Having said that I am sure there will be some in the audience who could tell me they have tried it and it has been a failure. That would not surprise me in the slightest. For such a concept to succeed there has got to be an enthusiastic academic who connects with a receptive industrialist. It has to be recognised that for most industrialists today, training is not the top item on their priority list for action, nor is it top of the pops for spending and the academic world has got to take the initiative and sell its wares to the industrialist. Don't expect the industrialist to be selling to you, he has enough problems selling his products without any other problems.

I know there are plenty of industrialists and academics who will want no part of the suggestion I have made. The arguments are not intellectually exciting nor are the results likely to justify any academic acclaim. I also know there are many industrialists who are looking for help, but whose criterion of judgement will be "will it work?" That is one of the fundamental questions which any good industrialist will ask and it is one which will only be answered by a first class academic mind.

What then do I conclude from these remarks? There is today in a variety of industries a shortage of those people with the necessary electro/systems training and, in particular, there is a shortage of people with experience. There is, however, no shortage of qualified technical personnel, they just have skills which are in surplus, but many of them are capable of being re-trained. The problem is not, however, a uniform one across the country. Some places have severe shortages, others have very little and the lack of mobility of individuals in the U.K. accentuates the problem. Many industries are not good at predicting early enough the sort of people required to allow the academic world to create the new courses and produce the new graduates. With the amount of effort being expended in this area today we should anticipate that the current problem will be solved eventually, but that will take time and the question is, how do we get from here to there? That I suggest will be most effectively achieved by closer local liaison and relationships between the industrial world and the academic world, and I suggest the prime drive and initiatives must come from the universities. The results will not come quickly or easily and will demand some national rethinking of what can be done and how, but surely that is the sort of thinking we should expect from universities. I think I can almost guarantee that for those who are prepared to try, it will initially be as frustrating as can be, but any success can open up a new vista of educational endeavour.

R26
110

Logica plc

PABH/sch/H300

22 March 1985

64 Newman Street
London W1A 4SE
UK

telephone 01-637 9111
telex 27200

The Prime Minister
10 Downing Street
London
SW1

The logo for Logica, featuring the word "Logica" in a bold, sans-serif font. The letter "o" is stylized as a circle with a dot in the center.

Dear Prime Minister

Thank you for your letter of 19 March inviting me to attend a meeting that you will be chairing at 10 Downing Street on Tuesday 21 May. It is with great regret that I have to decline the invitation as I am committed that morning to chair the opening session of Business Telecom '85 in the Barbican Centre.

Logica attaches great importance to the various initiatives that the Government is putting in place to tackle the shortages of skills in Information Technology. In addition to the various main discussion points in your letter, we do attach very great importance to the penultimate paragraph, that dealing with schools. We feel that a joint Government/Industry campaign in schools, particularly in girls' schools, could be most beneficial.

Yours sincerely

Philip Hughes

Philip Hughes

registered office	place of registration
64 Newman Street	England
London W1A 4SE	registered no
England	1631639
	VAT no
	371166558



SCOTTISH
DEVELOPMENT
AGENCY

CF

Chairman Robin Duthie CBE

The Rt Hon Margaret Thatcher MP
Prime Minister
10 Downing Street
LONDON SW1A 0AA

22 March 1985

Thank you for your letter of 19 March about the meeting to be held on 21 May to discuss a new initiative designed to increase the output of graduate engineers and technologists.

I shall be very pleased to attend.

Yours sincerely

SCIENCE & TECH: Budget ; : Pt. 2

INVITATION LIST FOR THE PRIME MINISTER'S MEETING WITH
INDUSTRIALISTS

Sir Austin Pearce, CBE,
Chairman,
British Aerospace plc,
Brooklands Road,
Weybridge,
Surrey KT13 0SJ.

Sir William Barlow,
Chief Executive,
BICC plc,
21 Bloomsbury Street,
London WC1.

Sir George Jefferson, CBE,
Chairman,
British Telecom plc,
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General Electric Company plc,
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Smiths Industries plc,
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Sir Kenneth Corfield,
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STC plc,
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Systems Designers Ltd.,
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Hampshire.

Peter Laister, Esq.,
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Thorn EMI plc,
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R.E. Utiger, Esq., CBE,
Group Managing Director,
TI Group plc,
50 Curzon Street,
London W1Y 7PN.

Sir Terence Beckett, CBE,
Director General,
CBI,
Centre Point,
103 New Oxford Street,
London WC1A 1OU.

Sir Robert Clayton, CBE,
Chairman,
Information Technology Skills Agency,
c/o CBI Education Foundation,
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London WC1A 1OU.

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N.M. Rothschild and Sons,
St. Swithuns Lane,
London EC4.

Robin Duthie, Esq., CBE,
Chairman,
Scottish Development Agency,
120 Bothwell Street,
Glasgow,
G2 7JP.

John Whyte, Esq., CBE,
Chairman,
Plessey Telecommunications Ltd,
Millbank Tower,
London SW1.



Chairman

National Westminster Bank PLC
41 Lothbury, London
EC2P 2BP

22nd March 1985

Dear Mr. Barclay

I have the Prime Minister's letter of 19th March inviting me to a meeting at Number 10 on Tuesday 21st May.

Unfortunately, I have a long-planned official bank visit to the Channel Islands covering that day and it would be very difficult to re-arrange but I understand that one of my Deputy Chairmen, Viscount Sandon, could attend in my place. As he is also Chairman of Powell Duffryn and of Bentley Engineering, he is well aware of the concern at the output of graduate engineers and technologists.

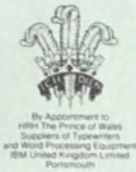
I am delighted at the initiative that is being taken in this field as it is becoming increasingly clear - not least from my membership of the House of Lords Select Committee on Overseas Trade - that our industrial performance is suffering severely in comparison with other developed countries from the standard and qualifications of our production foremen, engineers and managers.

Yours sincerely,
Lord Sandon

Lord Boardman

D. M. Barclay Esq
Private Secretary
10 Downing Street
London S.W.1

OW
MELA



IBM

Sir Edwin Nixon CBE
Chairman and Chief Executive

df

IBM United Kingdom Limited
PO Box 41
North Harbour
Portsmouth
Hampshire PO6 3AU
Telephone: Portsmouth (0705) 321212
Telex: 86741 (IBMPOR G)

Rt Hon Margaret Thatcher MP
Prime Minister and First Lord of the
Treasury
10 Downing Street
LONDON SW1

22 March 1985

post/s

Dear Prime Minister,

Thank you very much indeed for your letter dated 19 March, inviting me to join your discussion on some perceived problems on the Information Technology Industry and the perceived skills shortage.

I will be very happy to accept your invitation and I look forward to seeing you.

Yours sincerely,

Sir Edwin Nixon



Glaxo

Glaxo Holdings p.l.c. Clarges House 6-12 Clarges Street London W1Y 8DH

Telephone 01-493 4060
Telex 25456
Cables Glaxogroup London W1

Sir Austin Bide
Chairman

21st March 1985

Dear Mr. Addison,

Would you please thank The Prime Minister for her letter of 19th March inviting me to attend a meeting at No. 10 Downing Street on Tuesday, 21st May at 10 00 to discuss the need to increase the output of graduate engineers and technologists. I shall look forward to joining the discussion of this very important topic.

*Sincerely
Austin Bide*

AM - to note

Sir Austin Bide

Mark Addison, Esq.,
The Prime Minister's Office,
10 Downing Street,
London SW1

816



126
CF PPS



BY APPOINTMENT TO
HER MAJESTY THE QUEEN
MOTOR VEHICLE MANUFACTURERS
FORD MOTOR COMPANY LIMITED
BRENTWOOD ESSEX



BY APPOINTMENT TO
H.M. QUEEN ELIZABETH THE QUEEN MOTHER
MOTOR VEHICLE MANUFACTURERS
FORD MOTOR COMPANY LIMITED
BRENTWOOD ESSEX



BY APPOINTMENT TO
H.M. THE PRINCE OF WALES
MOTOR VEHICLE MANUFACTURERS
FORD MOTOR COMPANY LIMITED
BRENTWOOD ESSEX

Ford Motor Company Limited

Sam Toy
Chairman and Managing Director

Brentwood Essex CM13 3BW
England

March 21st, 1985

CR
- to answer note above

The Rt. Hon. Margaret Thatcher, MP
The Prime Minister
10 Downing Street
Whitehall, SW1

Dear Prime Minister

Thank you for your letter of March 19th, 1985.

Because we are as interested as we are in graduate recruitment, etc., and in bridging the gap between the academic world and industry, I shall be delighted to be with you and your colleagues on May 21st.

Yours sincerely

ST/BMS

SCIENCE
Budget



Ford Motor Company Limited

Sam Toy
Chairman and Managing Director

Brentwood Essex CM13 9RW
England



CF PPS.

**STANDARD TELEPHONES
AND CABLES PLC**

STC HOUSE
190 STRAND
LONDON WC2R 1DU
TELEPHONE 01 836 8055
TELEX 22385

**CHAIRMAN AND CHIEF EXECUTIVE
SIR KENNETH CORFIELD**

Secretary to:
The Prime Minister,
10 Downing Street,
London,
SW1

21st March 1985

Dear Secretary,

*Sir + Telex
Services*

In the absence of Sir Kenneth, this is to acknowledge receipt of The Prime Minister's letter of the 19th March which will receive his immediate attention on return to the office on Monday, 25th March.

Yours faithfully,

Kemie Glasser

K.M.T. Glasser (Miss),
Chairman's Secretariat

From
J. H. Harvey-Jones, MBE
Chairman

C/H/PS

Imperial Chemical Industries PLC

Imperial Chemical House
Millbank London SW1P 3JF
Telephone 01-834 4444

21st March 1985.

The Rt. Hon. Margaret Thatcher, MP,
10 Downing Street,
LONDON S.W.1.

123/3

Dear Prime Minister,

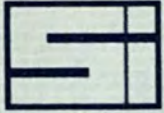
In Mr. Harvey-Jones' absence overseas on business I am acknowledging your letter to him of the 19th March. This will of course be brought to his attention on his return to the office next week.

Yours sincerely,

Patricia Brown

(Miss P.B. Brown)
Private Secretary

OW
MEX



SMITHS INDUSTRIES
PUBLIC LIMITED COMPANY

C/F ps?

SIR ROY SISSON, CHAIRMAN

765 Finchley Road, Childs Hill, London NW11 8DS Telephone 01-458 3232 Telex 928761 Telegrams Esseye London Telex

21st March, 1985.

The Prime Minister,
10 Downing Street,
LONDON,
SW1.

K23/3

Dear Prime Minister

Many thanks for your letter of 19th March and I shall be delighted to meet you and Keith Joseph on Tuesday, 21st May at 10 o'clock at Number 10. I look forward to a most interesting discussion.

Summary
Roy Sisson

CONFIDENTIAL

cejo



DEPARTMENT OF EDUCATION AND SCIENCE

ELIZABETH HOUSE, YORK ROAD, LONDON SE1 7PH

TELEPHONE 01-928 9222

FROM THE SECRETARY OF STATE

NEW TELEPHONE NUMBERS
From 4 March 1985

Direct line 01-934
Switchboard 01-934 9000

The Rt Hon George Younger MP
Secretary of State for Scotland
Dover House
Whitehall
LONDON
SW1

*MPBM
MGA 2/3*

21 March 1985

Jan George,

with MEA

Thank you for your letter of 14 March in response to mine of 8 March to Norman Tebbit.

You will know from my letter that, in proposing the projects to be included in phase 1 of this programme, my intention was to include only those which received a high grading both on grounds of academic excellence and industrial relevance and which, moreover, appeared likely to secure the admission of students this coming autumn without the need for additional building. It was consistent with those objectives that the project to increase intakes in production and electronic engineering at Strathclyde was excluded. And since the intention of the programme is to secure additional output of high quality across a range of disciplines and with strict regard to relative cost, my approach has intentionally not been one of seeking to secure a first phase based on strict regional proportions.

Nevertheless, in view of the fact that Strathclyde have now indicated that they will not require building work in order to admit students this autumn (and will, I understand, have more modest capital requirements thereafter than at first sight appeared), I would be prepared exceptionally to include the bid from Strathclyde as an addition to phase one of the programme. I have therefore included this project within the list of those notified to the UGC.

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As far as the proposed course at Stirling is concerned, however, the position is materially different. To include this course which, despite the other successes of the university in securing industrial support, has not commanded a high industrial rating in contention with other proposals would be inconsistent with our objectives and hence difficult to defend. You will have seen, moreover, that Norman Tebbit emphasised in his letter to me of 14 March, the importance he too places on industrial relevance. While bids from Scottish universities will therefore be considered under phase two of the programme, I would not propose to include Stirling in phase one and I hope that you will accept my reasons for not doing so.

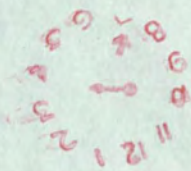
On your other points, I quite understand and am content with what you propose.

I am copying this letter to the Prime Minister, the Chancellor of the Exchequer, the Secretaries of State for Defence, Employment and Wales, the Minister without Portfolio, the Chancellor of the Duchy of Lancaster, the Chief Secretary to the Treasury, Sir Robert Armstrong and Sir Robin Nicholson.

4
Lawson,

Keir.

Science Budget; SCIENCE & TEETH.
Pt 2



22 MAR 1985

CONFIDENTIAL*ce no.*

DEPARTMENT OF EDUCATION AND SCIENCE

ELIZABETH HOUSE, YORK ROAD, LONDON SE1 7PH

TELEPHONE 01-928 9222

FROM THE SECRETARY OF STATE

The Rt Hon Norman Tebbit MP
 Secretary of State for Trade and Industry
 1-19 Victoria Street
 LONDON
 SW1

*NBPM
 Mar 22/3*

21 March 1985.

Dear Norman,

INCREASING THE OUTPUT OF ENGINEERS AND TECHNOLOGISTS

Thank you for your letter of 14 March in response to mine of 8 March.

I very much agree with you that only those courses which have been awarded a high grading for industrial relevance should be selected for inclusion in the first phase of the programme. My officials have been in touch with yours to clarify the position, and I understand that your officials are now satisfied that all the institutions proposed for inclusion in phase 1 (Annex A to my letter of 8 March) have in fact obtained the necessary high industrial grading.

I am grateful to you for your agreement to my other proposals and, in the light of other replies, officials here have now communicated the proposed programme to the UGC, subject only to the addition specified in my letter to George Younger also of today's date.

I am sending copies of this letter to the Prime Minister, the Chancellor of the Exchequer, the Secretaries of State for Defence, Employment and Wales, the Minister without Portfolio, the Chancellor of the Duchy of Lancaster, the Chief Secretary to the Treasury, Sir Robert Armstrong and Sir Robin Nicholson.

Erin.

Kevin.

Science Budget: Science & Tech. 142.

22 MAR 1985
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ONE WELBECK STREET,
LONDON, W1A 1DF

CHAIRMAN'S OFFICE
R. C. THORNTON

20th March, 1985.

The Rt. Hon. Margaret Thatcher, M.P.,
10 Downing Street,
London. SW1.

Dear Prime Minister,

I accept with much pleasure your invitation to
10 Downing Street on Tuesday, 21st May at
1000 hrs.

Yours sincerely,

Bob Thornton

SCIENCE & TECHNOLOGY:

ONE WELBECK STREET

LONDON, W1A 1DF

Budget: Pt 2

THE BRITISH SOCIETY

FOR THE HISTORY OF SCIENCE

DEBENHAM'S PLC

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10 DOWNING STREET

THE PRIME MINISTER

19 March, 1985

Dear Sir George

You will know of the concern voiced in many quarters and especially by business about the need to increase the output of graduate engineers and technologists. Attention has been drawn to this, in particular, by the Engineering Council and in the first report of the Committee on IT Skills Shortages under the chairmanship of John Butcher at the Department of Trade and Industry.

The Government has been considering these representations very carefully and you will have heard that we have announced today our intention to redeploy some resources for this purpose. I enclose a copy of the Department of Education and Science press notice. We envisage a special programme costing about £43 million over the three years 1985-86 to 1987-88. I am sure you agree that this programme will be worthwhile only if it receives sufficient industrial co-operation and support of the kind offered by the industrial members of John Butcher's committee. The first phase of the programme affecting student intakes in October 1985 will be launched soon - details should be announced next month. Future phases, and the success of the programme generally, will depend crucially on the willingness of industry to play an active part.

vc

I would like to discuss this new initiative with you (and with the others on the enclosed list). I particularly wish to learn how far industry would contribute to such a programme by providing:

- (i) more help with equipment;
- (ii) more help with teaching staff - this is vitally important because it is doubtful whether our higher education institutions will be able to recruit qualified staff in sufficient numbers;
- (iii) more placements for students on sandwich courses;
- (iv) active help with the design of relevant courses;
- (v) a readiness to offer worthwhile initial jobs and subsequent careers to the graduates.

I and my colleagues would also be very interested to hear your views on the following questions:

- (a) which type of graduate is likely to be in greatest demand - for example, should we give priority to electronic engineering or to software engineering or aim for a broader spread? And is the demand principally for university graduates or does industry find graduates from the better polytechnics equally (or perhaps more) useful for many purposes?
- (b) how should co-operation between industry and the chosen higher education institutions be organised? Should it be organised centrally, for example, through the IT Skills Agency, the

Scottish Development Agency, Government Departments and the UGC; or would it be better for each participating company to "adopt" one or more participating institutions?

- (c) would industry be willing to sponsor more students? This is likely to be a very effective way of influencing the career choices of pupils at school and encouraging more young people to study maths, physics and technology.

Finally, if there were time, I should like to take the opportunity to seek your views on what more could be done - and I know a lot is being done already - to change the attitudes of parents, teachers and pupils towards careers in business.

I hope you will be able to meet me, Keith Joseph and other colleagues on Tuesday, 21 May at 1000 hrs in No.10 Downing Street. Would you please let my office know if you can come.

Yours sincerely
Margaret Thatcher

Sir George Jefferson, C.B.E.



10 DOWNING STREET

From the Private Secretary

19 March 1985

THE SWITCH

I attach a copy of one of the letters to industrialists despatched today, together with a full list of those to whom invitations have been sent.

Aside from the industrialists, Ministers we are expecting at the meeting include the Secretary of State for Trade and Industry, the Secretary of State for Employment, the Minister without Portfolio, the Parliamentary Under-Secretary of State for Industry, and of course your own Secretary of State.

I am copying this letter and enclosure to the Private Secretaries to the Secretaries of State for Energy, Scotland, Wales, Employment, Trade and Industry, the Minister without Portfolio and Sir Robert Armstrong.

(MARK ADDISON)

Miss Elizabeth Hodkinson,
Department of Education and Science.



RAMATHV

10 DOWNING STREET

THE PRIME MINISTER

19 March, 1985

Dear Tom,

You will know of the concern voiced in many quarters and especially by business about the need to increase the output of graduate engineers and technologists. Attention has been drawn to this, in particular, by the Engineering Council and in the first report of the Committee on IT Skills Shortages under the chairmanship of John Butcher at the Department of Trade and Industry.

The Government has been considering these representations very carefully and you will have heard that we have announced today our intention to redeploy some resources for this purpose. I enclose a copy of the Department of Education and Science press notice. We envisage a special programme costing about £43 million over the three years 1985-86 to 1987-88. I am sure you agree that this programme will be worthwhile only if it receives sufficient industrial co-operation and support of the kind offered by the industrial members of John Butcher's committee. The first phase of the programme affecting student intakes in October 1985 will be launched soon - details should be announced next month. Future phases, and the success of the programme generally, will depend crucially on the willingness of industry to play an active part.

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- Finally, if there were time, I should like to take the opportunity to seek your views on what more could be done - and I know a lot is being done already - to change the attitudes of parents, teachers and pupils towards careers in business.

I hope you will be able to meet me, Keith Joseph and other colleagues on Tuesday, 21 May at 1000 hrs in No.10 Downing Street. Would you please let my office know if you can come.

Yours ever

Margaret

The Lord Boardman MC TD DL



DEPARTMENT OF EDUCATION and SCIENCE

Elizabeth House York Road London SE1 7PH

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PRESS NOTICE 62/85

TELEPHONE: 01-974-9880/9

19 MARCH 1985

NEW PROGRAMME WILL INCREASE ENGINEERING AND TECHNOLOGY PLACES IN HIGHER EDUCATION

The Government is to make £43m available over the next three years to pay for more students in higher education to study engineering and technology, Education Secretary Sir Keith Joseph told the House of Commons today.

Sir Keith said the programme marked a substantial response to requests from industry for an increased output of engineering and technology graduates.

The new programme is in addition to the Government's information technology initiative launched in 1982, which is adding 5,000 extra higher education places in IT-related subjects, and to the £14m engineering and technology programme in Scotland announced in November 1984.

Discussions are going on with the University Grants Committee and others to decide which institutions should benefit from the new programme. An announcement on the allocation of extra places for the next academic year is expected soon.

In a written reply to a Parliamentary Question, Sir Keith said:

"My Right Hon. Friend the Chancellor of the Exchequer has today announced that the Government is to mount a £43m programme over the next three years for the provision within higher education institutions of additional places in engineering and technology.

"The costs will be contained within existing expenditure programmes, with contributions from the Departments of Trade and Industry, Employment and Energy and from the Scottish and Welsh Offices, as well as from my Department's programme.

"I am discussing with the University Grants Committee and others which institutions should benefit from this programme, and I hope to be able to announce soon those institutions that will admit additional students during 1985-86. Further announcements about later years will follow.

"This programme marks a substantial response to requests from industry for an increased output of graduates in engineering and technology. Perceived industrial worth and cost effectiveness will therefore be important criteria in determining the allocation of the programme between institutions.

"We shall be looking to industry to demonstrate the value it attaches to the programme by offering concrete support in various ways, along the lines proposed by the IT Skills Shortages Committee, and we shall be discussing further with employers' representatives how this can be assured.

"This programme is a substantial addition to the initiative I announced in December 1982, for a programme to provide some 5,000 additional places in IT-related subjects, and to the programme costing £14m over three years which my Right Hon. Friend the Secretary of State for Scotland announced in November 1984 to increase the output of engineers and technologists from the Scottish central institutions.

"The combined effect of these programmes will be to provide a substantial further stimulus to the output of engineers and technologists and hence to the economy."

NOTES TO EDITORS

1. This new programme follows the advice of the Engineering Council which has advocated an increase in the resources provided for the education of engineers - see, for example, the Council's Policy Statement on Resources for Engineering Education published in February 1984.
2. Also relevant is the report of the IT Skills Shortages Committee, chaired by Mr John Butcher MP, Parliamentary Under Secretary of State at the Department of Trade and Industry. The committee concluded - in its first report dealing with the supply of graduates with IT skills - that, while the extent of any skills shortage was difficult to gauge, industry could undoubtedly absorb additional graduates so qualified. The report quotes the Alvey Directorate estimate of a shortfall of 1,500 graduates now (April 1984) and of 5,000 by 1988.
3. Since the programme marks in large part a response to requests from industry, an important consideration in selecting participating institutions will be that the courses should be of demonstrable value to industry. Advice on this is being sought from members of the Information Technology Skills Agency (ITSA), recently established under the aegis of the Confederation of British Industry's Education Foundation, and in respect of the Scottish universities from the Scottish Development Agency. It will also be expected that industry will offer positive support for the programme and account will be taken of this in determining provision under the programme.

4. In order to enable an increase in student intakes under the programme during the coming academic year, there will be two phases. The first will comprise a small number of courses which can admit students immediately, without prior building work. Each, selected by the UGC after consultation with the ITSA, will be expected to demonstrate high academic quality and assured industrial support. It is hoped to announce these shortly. The main phase of the programme will consist of courses which require building work in order to admit students. These will also be expected to demonstrate high academic quality and industrial relevance. This phase may include some institutions not within the responsibility of the UGC.

---000---

INVITATION LIST FOR THE PRIME MINISTER'S MEETING WITH INDUSTRIALISTS

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Sir George Jefferson CBE, FEng, FIMechE, FRAeS, FRSA, FBIM, FCGI
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St Swithuns Lane
LONDON EC4

Robin Durtie Esq CBE
Chairman
Scottish Development
Agency
120 Bothwick Street
Glasgow
G2 7JP.



Prime Minister. ⁽²⁾

This is an interim progress report from Sir Robert Armstrong, drawn up in conjunction with Sir Robin Nieldson. For information only at this stage. M&A 18/3

Ref. A085/809

PRIME MINISTER

Annual Review of Government Funded R & D 1984:
Follow up to Acard's Comments

When I submitted to you the 1984 Annual Review of Government Funded R & D last July, I enclosed the independent advice given by the Advisory Council for Applied Research and Development (ACARD) in accordance with the Annual Review mechanism set out in Cmnd 8591.

2. Your Private Secretary indicated (6 August) that you were content for the Sub-Committee of Chief Scientists to consider most of ACARD's comments, while a separate mechanism should be found to consider the issues raised in respect of defence R & D expenditure.

3. The following steps have been taken:

1. An official group, under Cabinet Office chairmanship, is currently considering ACARD's comments on defence R & D expenditure: the terms of reference are attached.

2. The Sub-Committee of Chief Scientists has set up an interdepartmental group to prepare a response to ACARD's points on the balance between the Government's support for R & D for agriculture, fisheries and food and for manufacturing.

3. The Sub-Committee of Chief Scientists has received, and endorsed, a response to ACARD's comments on the distribution of support among different industrial sectors, prepared by the Department of Trade and Industry; a copy is enclosed. In order that there can be a dialogue between Departments and ACARD, I propose to send this response to the Council so that they can take it into account whilst preparing their



advice on the 1985 Review. Similarly, when the Sub-Committee is satisfied, the response concerning the split between agriculture and manufacturing R & D will be sent directly to ACARD.

4. ACARD also commented that the statements made by Departments and Research Councils setting out the objectives and targets for their research expenditures, did not demonstrate a clear purpose, were seldom expressed in quantified terms, and did not include reference to reasons for shifts in the balance of spending. In order to encourage Departments to submit more informative statements for the 1985 Review, a revised request incorporating guidelines for Departments has been sent from the Science and Technology Secretariat which co-ordinates the Annual Review.

RTA

ROBERT ARMSTRONG

18 March 1985

TERMS OF REFERENCE

To prepare a report for Ministers for submission not later than the end of June 1965 covering the following matters:

- i. the economic effect of current and projected levels of Government funded defence research and development, taking account of the benefits which might be derived from alternative use of the skilled human and other resources for civil research and development and production or in other ways;
- ii. without prejudice to the responsibilities of the Secretary of State for Defence for the overall management of the defence programme, the broad policy options which might be available for reducing the amount of Government funded defence research and development carried out in the United Kingdom and the advantages and disadvantages of such options;
- iii. the measures in prospect and any further measures which might be taken to exploit for the benefit of the United Kingdom economy the research and development carried out in the United Kingdom for defence purposes.



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ACARD'S COMMENTS ON INDUSTRIAL R&D AS REPORTED IN THE
ANNUAL REVIEW OF GOVERNMENT FUNDED R&D 1984

RESPONSE FROM THE DEPARTMENT OF TRADE AND INDUSTRY

SUMMARY

ACARD's basic criticisms of DTI's R&D expenditure are that it is not in their view sufficiently related to rapidly growing sectors of industry, to the relative economic significance of particular sectors, to long term high risk ventures, or to sectors that yield high value-added per capita; and that it is not sufficiently concentrated on a few key sectors. These criticisms are based on an analysis of DTI expenditure based on the Standard Industrial Classification. But this is a fundamentally misleading analysis. DTI's expenditure is very largely concentrated on new technologies - eg microelectronics, flexible manufacturing systems, computer aided design and manufacture - which can be, and if British industry is to be competitive must be, applied across a wide range of manufacturing industries. The apparent scatter of DTI expenditure is therefore deceptive: it is in fact concentrated on developments which can produce the highest pay-off to the economy.

The detailed statistics of DTI's R&D programmes that are set out in the second part of the Annual Report show that the pattern of expenditure, once allowance has been made for the widely disseminated impact of enabling technologies, is very much in line with what ACARD proposes. It includes marked concentration on electronics and information technology

continued

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(including the Alvey programme); major programmes on biotechnology and R&D in support of public purchasing; and a heavy expenditure on the long term, high risk areas of civil aviation and space.

DTI has prepared a commentary for ACARD which addresses each of the Council's comments and sets out how DTI has already met many of ACARD's recommendations. This is ... attached as an Annex.

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ACARD'S COMMENTS ON INDUSTRIAL R&D AS REPORTED IN THE ANNUAL
REVIEW OF GOVERNMENT FUNDED R&D 1984

A Department of Trade and Industry commentary on ACARD's views

Introduction

As announced in Cmnd 8591, the Advisory Council for Applied Research and Development (ACARD) was invited to provide independent advice on the results of the 1984 Annual Review of Government Funded R&D. ACARD made major comments about three areas:

- (i) defence R&D,
- (ii) the balance of support between R&D for agriculture, fisheries and food on the one hand and R&D for manufacturing on the other, and
- (iii) industrial R&D.

This note addresses the third issue, in those areas for which DTI is responsible.

ACARD Comments on Industrial R&D.

ACARD made both general comments and specific comments on industrial R&D and on the features that they expected to be associated with Government expenditure. In order to assess the distribution of Government expenditures over different industries the Council examined the data - a tabulation of expenditures according to the 1980 Standard Industrial Classification (SIC) Product Groups - presented in Chapter 4 of the Review. They



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acknowledged that these were not ideal for the purpose. The Product Group analysis presents a fundamental problem when applied to DTI data, because Product Groups concentrate on 'sectors' and 'industries' and were designed for the analysis of data from firms. Much DTI support is aimed at enabling technologies which affect many sectors - for example microelectronics. It is therefore not appropriate to categorise this support by end product. DTI believes that its policy is more properly directed in this way rather than to specific sectors.

In developing its policy for the support of industrial R&D, DTI has taken note of the views expressed previously by ACARD and also the various ACARD reports already published. ACARD will be interested in Table 1 attached, in which the approximate DTI expenditure on technology and innovation in the Financial ^{year} 1983/84 has been allocated against sub-headings covered by the recommendations of ACARD reports. This represents nearly 30% of the Department's total expenditure in support of industrial technology and innovation during 1983/84 (excluding Civil Aviation Act Launch Aid). In addition to the R&D expenditure covered in the Annual Review, the Department also has additional expenditure under Section 8 of the Industry Act in the areas covered by ACARD Reports and this is included in the figures given in the table. DTI has also circulated to ACARD a copy of a graph showing the increase of industrial R&D spend since 1978. A copy of this graph is attached.

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1. ACARD's General Conclusions on Industrial R&D.

1.1 The Council concluded that "The distribution of expenditures in support of manufacturing industries appears only loosely connected with the private sector's market perceptions. A coherent policy to guide such expenditures is required. Provisionally, ACARD think this should be based on criteria related to growth, risk and concentration of resources."

DTI Comment.

1.2 A detailed statistical breakdown of DTI's support for R&D is given in Part II of the Annual Review. This shows that in 1983/4 (and the projected trend is consistent in later years) nearly three quarters of this Department's R&D expenditure was concentrated in the fields of Electronics, Information Technology, Mechanical and Electrical Engineering, Aeronautics and Space Research. These sectors represent growth and risk and demonstrate a concentration of resources. Within them priority is given to support for the applications of advanced technology. The importance of other key technologies is recognised, for example expenditure on biotechnology is just entering the growth (and risk) phase.

1.3 The Department is advised on its general industrial R & D programmes by 5 "Requirements Boards". Each has an industrial Chairman and strong industrial representation to give full weight to the private sector's market perceptions. In addition the Department is made aware of industrial needs through direct contacts with companies, through NEDO and its Sector Working Parties and Economic Development Councils and through advice from its own Industrial Development Unit and the Industrial Development Advisory Board.

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2. ACARD's Conclusions on Specific Criteria for Industrial R&D.

- 2.1 ACARD states that "Government expenditures appear not to respond to changes in perceptions of market opportunities or directions of technological advance."

DTI Comment

There have been significant changes in the balance of DTI's R&D expenditure over the period since the setting up of the Requirements Boards. For example, industrial energy conservation R&D rose to a peak and has fallen. Research into space technology, biotechnology, and information technology have increased. But many factors affect the changes besides changing market perceptions. For example, it may be appropriate to reduce funding when the private sector support for an emerging technology grows.

- 2.2 ACARD states that they expected "Government expenditure to have at least one of certain features as follows."
- 2.2.1 "To be concentrated in rapidly growing industries, thus accelerating their growth. But, with a few exceptions they are not."

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DTI Comment

The Department supports R&D primarily to promote and encourage change. Expenditure on general industrial R&D is aimed at enhancing the adoption of key (or generic) technologies such as microelectronics or robotics. These can be applied across a wide range of industries and to a large number of products. The relevant programmes can be deployed flexibly to support firms with worthwhile applications in any sector. Rapidly growing sectors may be well able to finance their own R&D. The detailed analysis of DTI expenditure which is given in Part II of the Review shows that funds are concentrated particularly in areas undergoing rapid change.

- 2.2.2 "To be related to the economic significance of the sector concerned, as measured by value added or output. But patently they are not."

DTI Comment

Not all sectors are equally R&D intensive and many factors other than added value need to be taken into account in allocating support. For example manufacturers of components and materials provide essential underpinning to a wide range of industry, though they themselves may not represent high value added or direct economic significance. Also, as discussed, much support is directed to the promotion of enabling technology rather than to specific products.

- 2.2.3 "To be associated with long term high risk ventures. Some of course, are, but many expenditures are not, as shown by the 'seed corn' data in Chapter 6 of the Review."

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DTI Comment

The definition of "seed corn" research has caused considerable difficulty as is recognised by both ACARD and the Cabinet Office Secretariat and the definition is to be changed next year. DTI does not believe that valid conclusions can yet be based on the interpretation of existing data under this heading. As explained long term high risk is one of the criteria used by DTI in allocating support.

The Department's programmes in Space Research and Aeronautics are both long term and high risk. Also, by definition, DTI support goes to ventures with a substantial degree of uncertainty - firms do not need Government support for short term low risk projects. The Alvey programme is an excellent example of longer term, high risk R&D that ACARD look to Government to support.

- 2.2.4 "Within manufacturing, to be concentrated in the high value added per capita industries where we have an advantage over newly industrialised countries. But they are not."

DTI Comment

In 1983/4, the DTI allocated just over half of its R&D support to Aeronautics and Space Research. General Industrial R&D expenditure amounted to a further 36% of the total expenditure and of this, 40% was concentrated on Information Technology and Electronics. This represents the type of concentration that ACARD was seeking.

CONFIDENTIAL



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2.2.5 "To be concentrated in a few sectors where the limited resources available may make a real impact. But there is a broad scatter of funding, in part the consequence of DTI support for the introduction of new technology into traditional industries."

DTI Comment

There is a balance to be struck in the distribution of DTI support. There is some concentration in a few sectors as the data on Aeronautics, Space and Information Technology demonstrates. However, a proportion of DTI support is spent in response to good proposals coming to the Department from firms in all sectors.

If ACARD are calling for a concentration of DTI support in a few areas then:

- (a) the areas for concentration must be identified.
- (b) the areas which are to lose support as a consequence must also be identified.

It is for ACARD to be more specific how this should be achieved. The DTI's concentration on key technologies does have many of the other consequences that ACARD has called for. It is intended to give the maximum yield from limited resources and the impact can often be strongly felt in the traditional industries. The value-added contribution which traditional industries make to the economy is considerable.

7
CONFIDENTIAL



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Finally, ACARD is giving further consideration to financial aspects of innovation and the DTI would welcome an exchange of views in due course.

RTP1

14 January 1985

D13/J19

999-80

8

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Table 1

DTI EXPENDITURE IN AREAS RECOMMENDED BY ACARD REPORTS

ACARD Report	Approximate DTI Expenditure £m 1983/84
Applications of Semi Conductor Technology	32
Information Technology	44
Computer Aided Design and Manufacture	5
Robotics (Joining and Assembly)	2
Biotechnology	5
R&D for Public Purchasing	15

CONFIDENTIAL



Handwritten initials/signature in the top right corner.

MINISTRY OF DEFENCE WHITEHALL LONDON SW1A 2HB

TELEPHONE 01-218 9000
DIRECT DIALLING 01-218 2111/3

MO 2/2/8

15th March 1985

Handwritten signature: Ian Brown

Handwritten initials/signature.

*Prime Minister²
For information. This comes too late
to be included in tomorrow's announcement,
but will feature when more details of
the programme are given next month.
MKA 18/3*

SKILL SHORTAGES

Thank you for your letter of 4th March about the scheme which you and other colleagues have put together to increase the number of engineering and technology university places.

As you may be aware, my Department already makes a substantial contribution in this field. We sponsor some 150 undergraduate and 10 post-graduate courses for MOD employees and a further 200 students who are not committed to join the MOD. The majority of these students are in engineering and technology disciplines. We also maintain a professor and supporting academic staff in naval engineering at the University of London. In addition to this support on the civilian side, the MOD funds a variety of undergraduate and post-graduate schemes for Service personnel, many of whom later in their careers transfer to industry and thus contribute to the national stock of engineering skills. More widely, following a recent and separate inter-Departmental initiative to maintain the strength of the national science base, I have agreed to build up the level of direct funding from my budget of defence-related research at the universities to £15 million per annum over the next 3 years. We will also be cooperating with the universities in the joint design and use of major and specialised facilities. Both of these can be assumed to release resources in the universities which could be allocated to undergraduate places.

The Rt Hon Norman Tebbit MP



I am also prepared, in the spirit of the scheme you describe in your letter, to provide, by means of re-allocating resources within my Department, up to an additional £1 million per annum over the next 3 years to permit a substantial increase in the number of university students directly sponsored by the Ministry of Defence in science, technology and engineering disciplines. My officials are working up the details of this expansion and they will be in touch with your officials and Keith Joseph's as the work progresses. I shall be looking for imaginative ways of attracting the right response - but meanwhile I would be happy for this step that I am taking to be included in the announcement of the inter-Departmental scheme.

I am copying this letter to the Prime Minister and the other recipients of your own.

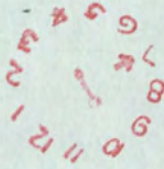
A handwritten signature in dark ink, consisting of a stylized 'M' followed by a vertical line and a horizontal stroke at the bottom.

Michael Heseltine

SCIENCE

Budget

PEZ



18 JAN 1981

PRIME MINISTER

As you know, the boost in funding students in engineering and technology (the "Switch") is being announced in the Budget speech. You have agreed to meet a number of industrialists to discuss the key contribution they can and must make to this programme, and have seen a list of the people DTI suggested should be invited (Flag A, with one new name).

A time has been set aside on the morning of Tuesday, 21 May for this meeting. The invitations should be despatched on Tuesday next week, after the Budget speech, and this should give the industrialists enough warning to allow a good many to attend.

The twenty-seven letters of invitation do not have to be signed until Monday night but you will probably prefer to sign them over the weekend, if possible. They are, therefore, attached at Flag B. If you would, however, like to make any changes to the letter, there will still be time to do so.

I attach a press release notice for information, at Flag C, which you cleared on Thursday night.

UAT

PP (Mark Addison)

15 March, 1985

INVITATION LIST FOR THE PRIME MINISTER'S MEETING WITH INDUSTRIALISTS

Sir Austin William Pearce, CBE PhD, FInst Pet, FBIM
Chairman
British Aerospace PLC
Brooklands Road
Weybridge
SURREY KT13 OSJ

Sir William Barlow FEng, FIMechE, FIEE
Chief Executive
BICC ~~PLC~~
21 Bloomsbury Street
LONDON WC1

Sir George Jefferson CBE, FEng, FIMechE, FRAeS, FRSA, FBIM, FCGI
Chairman
British Telecom PLC
23 Howard Street
LONDON W1P 6HQ

Robert C Thornton Esq FCCA
Chairman
Debenhams PLC
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Managing Director
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S Toy Esq
Chairman
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~~The Rt Hon~~ Lord Weinstock of Bowden FSS
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Sir Austin Bide, BSc FRIC
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Sir Edwin Nixon CBE
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Chairman
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P A B Hughes Esq CBE
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~~The Rt Hon~~ the Lord Boardman MC, TD, DL
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Chairman
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Sir John Clark
Chairman
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R E Utiger Esq CBE
Group Managing Director
TI Group PLC
14 South Street
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Sir Terence Becket CBE, FEng, FIMechE, CBIM, FIMI
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CBI
Centre Point
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Sir Robert Clayton CBE, FEng, FIEE, FInstP, FRAeS, FIERE, FIEEE
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Sir Francis Tombs BSC, LLO, FEng, FIEE, FIMEchE
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St Swithuns Lane
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+ Robin Durtie Esq CBE
Chairman
Scottish Development Agency
120 Borthwick Street
Glasgow
G2 7JP

SCI + TECH: Budget
Pt 2



to the... of...
...
...
...
...

cc 10



MBPM
Met. 11/13

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WHITEHALL LONDON SW1A 2ER
Tel. 01-233 3000 (Switsfwrdd)
01-233 6106 (Llinell Union)
Oddl wrth Ysgrifennydd Gwladol Cymru

WELSH OFFICE
GWYDYR HOUSE
WHITEHALL LONDON SW1A 2ER
Tel. 01-233 3000 (Switchboard)
01-233 6106 (Direct Line)
From The Secretary of State for Wales

The Rt Hon Nicholas Edwards MP

15 March 1985

Dr Keck

THE SWITCH TO SCIENCE AND TECHNOLOGY

Thank you for copying your letter to Norman Tebbit of 8 March to me.

I agree that it is important to get the Switch programme under way as quickly as possible. Industry needs the additional graduates urgently and early action on the Government's part should encourage companies to play their part.

When I agreed that my Department should contribute to the funding of the programme it was on the understanding that there would be an increase in the number of science and technology under-graduates at the University of Wales. I am pleased therefore to see that the list of courses in Annex A of your letter includes courses at Bangor and Swansea; and I note that the criteria you suggest for the second phase of the programme include a need to ensure an appropriate balance as between England, Wales and Scotland. I am content with your proposals for Phase 1.

Your comments about the possibility of including the public sector institutions in the Switch programme were also encouraging. I believe there is much to be said for widening the Switch programme to include the public sector - or at the least the Polytechnics. While there is only one Polytechnic in Wales it does have some expertise to offer in the IT field and I am confident that it could demonstrate that industry will support its work with gifts of equipment etc. As far as Wales is concerned I believe the Polytechnic, and possibly other higher education institutions, are capable of the degree of excellence which we are looking for and could play a useful part in the Switch programme.

/ I am copying this letter to the recipients of yours.

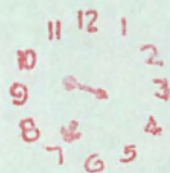
John
Wear

Sir Keith Joseph Bt MP
Secretary of State for Education and Science

Prime Minister
Chancellor of the Exchequer
Secretary of State for Defence
Secretary of State for Employment
Secretary of State for Scotland
Minister Without Portfolio
Chancellor of the Duchy of Lancaster
Chief Secretary to the Treasury
Sir Robert Armstrong
Sir Robin Nicholson

Science : Science Budget #2

18 MAR 1985



CONFIDENTIAL

NEW PROGRAMME WILL INCREASE ENGINEERING AND TECHNOLOGY PLACES IN HIGHER EDUCATION

The Government is to make an extra £43m available over the next three years to pay for more students in higher education to study engineering and technology, Education Secretary Sir Keith Joseph told the House of Commons today.

Sir Keith said the programme marked a substantial response to requests from industry for an increased output of engineering and technology graduates.

The new programme is ^{a major} [substantial] addition to the earlier initiative, announced in December 1982, for a programme over three years to provide about 5,000 extra places in information technology (IT) related subjects, at a cost of £37m.

Discussions are going on with the University Grants Committee and others to decide which institutions should benefit from the new programme. An announcement on the allocation of extra places for the next academic year ^{will be made} [is expected] soon.

In a written reply to a Question from Mr , MP for , who asked if he would take steps to increase the output of engineering and technology graduates and if he would make a statement, Sir Keith said:

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"My Right Hon. Friend the Chancellor of the Exchequer has today announced that the Government is to make available an additional £43m over the next three years for the provision within higher education institutions of places in engineering and technology.

"I am discussing with the University Grants Committee (UGC) and others which institutions should benefit from this programme, and I hope to be able to announce soon those institutions which will admit additional students during 1985/86. Further announcements about later years will follow.

"This programme marks a substantial response to requests from industry for an increased output of graduates in engineering and technology. An important criterion in determining provision under this programme will therefore be its perceived industrial worth.

"We shall be looking to industry to demonstrate the value it attaches to provision under the programme by offering concrete support in various ways and we shall be discussing further with employers' representatives how this can be assured.

"This programme is a major addition to the initiative I announced in December 1982, for a programme

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over three years to provide some 5,000 additional places in IT-related subjects, at a cost of £37m.

"The final intake under that programme will be in the 1985-86 academic year, and I have recently asked the UGC to ensure that the additional numbers thereafter will be maintained.

"The combined effect of these two programmes will be to provide a substantial further stimulus to the output of engineers and technologists and hence to the economy."

NOTES TO EDITORS

1. This new programme follows the advice of the Engineering Council which has advocated an increase in the resources provided for the education of engineers - see, for example, the Council's Policy Statement on Resources for Engineering Education published in February 1984.

2. Also relevant is the report of the IT Skills Shortages Committee, chaired by Mr John Butcher MP, Parliamentary Under Secretary of State at the Department of Trade and Industry. The committee concluded - in its first report dealing with the supply of graduates with IT skills - that, while the extent of any skills shortage was difficult to gauge, industry could undoub-

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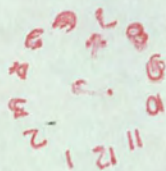
3. Since the programme marks in large part a response to requests from industry, an important consideration in selecting participating institutions will be that the courses should be of demonstrable value to industry. Advice on this is being sought from members of the Information Technology Skills Agency (ITSA), recently established under the aegis of the Confederation of British Industry's Education Foundation. It will also be expected that industry will offer positive support for the programme and account will be taken of this in determining provision under the programme.

4. In order to enable an increase in student intakes under the programme during the coming academic year, there will be two phases. The first will comprise a small number of courses which can admit students immediately, without prior building work. Each, selected by the UGC after consultation with the ITSA, will be expected to demonstrate high academic quality and assured industrial support. It is hoped to announce these shortly. The main phase of the programme will consist of courses which require building work in order to admit students. These will also be expected to demonstrate high academic quality and industrial relevance. This phase may include some institutions not within the responsibility of the UGC.

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not within the responsibility of the UGC.

ECON POL: Budget A13



14 MAR 1985

cc Philip Wyn Owen

Mark



Revised draft letter as
promised. I will provide
copies of the press notice on Monday.

With the Private Secretary's Compliments

I will also confirm finally the
list of those to be invited.

Elizabeth 15/3

DEPARTMENT OF EDUCATION AND SCIENCE

Elizabeth House
York Road
London SE1 7PH

Telephone 01-928 9222

DRAFT LETTER FOR THE PRIME MINISTER'S SIGNATURE TO
INDUSTRIALISTS

RANAHV

You will ^{know} ~~be aware~~ of the concern voiced in many quarters and especially by business about the need to increase the output of graduate engineers and technologists. Attention has been drawn to this, in particular, by the Engineering Council and in the first report of the Committee on IT Skills Shortages under the chairmanship of John Butcher at the Department of Trade and Industry.

2. The Government has been considering these representations very carefully and you will have heard that ~~the Government has~~ ^{we have} announced today our intention to ~~assign~~ ^{redeploy} some ~~extra~~ resources for this purpose. I enclose a copy of the DES press notice. We envisage a special programme costing about £43 million over the 3 years 1985-86 to 1987-88. I am sure ^{you} ~~that~~ you ~~will appreciate~~ ^{will} ~~would~~ be worthwhile only if it received ^s sufficient industrial co-operation and support of the kind offered by the industrial members of John Butcher's committee. The first phase of the programme affecting student intakes in October 1985 will be launched soon - details should be announced next month. Future phases, and the success of the programme generally, will depend crucially on the willingness of industry to play an active part.

3. I would like to discuss this new initiative with you (and with the others on the enclosed list). I particularly wish to learn how far industry would contribute to such a programme by providing:

- (i) more help with equipment;
- (ii) more help with teaching staff - this is vitally important because it is doubtful whether our HE institutions will be able to recruit qualified staff in sufficient numbers;
- (iii) more placements for students on sandwich courses;
- (iv) active help with the design of relevant courses;
- (v) a readiness to offer worthwhile initial jobs and subsequent careers to the graduates.

I and my colleagues would also be very interested to hear your views

4. ~~Ministers will also wish to hear views~~ on the following questions:

- (a) Which type of graduate is likely to be in greatest demand - for example, should we give priority to electronic engineering or to software engineering or aim for a broader spread? And is the demand principally for university graduates or does industry find graduates from the better polytechnics equally (or perhaps more useful) for many purposes?
- (b) How should co-operation between industry and the chosen HE institutions be organised? Should it be organised centrally, for example, through the IT Skills Agency, ^{the Scottish Development Agency,} Government Departments and the UGC; or would it be better for each participating company to "adopt" one or more participating institutions?
- (c) Would industry be willing to sponsor more students? This is likely to be a very effective way of influencing the career choices of pupils at school and encouraging more young people to study maths, physics and technology.

5. Finally, if there were time, I should like to take the opportunity to seek your views on what more could be done - and I know a lot is being done already - to change the attitudes of parents, teachers and pupils towards careers in business.

6. I hope you will be able to meet me, Keith Joseph and other colleagues on Tuesday 21 May at 10am in No 10 Downing St. Would you please let my office know if you can come?



CE/NO

Caxton House Tothill Street London SW1H 9NF

Telephone Direct Line 01-213 6400.....

Switchboard 01-213 3000

WBP

Sir Keith Joseph Bt MP
 Secretary of State
 Department of Education and Science
 Elizabeth House
 York Road
 Waterloo
 LONDON SE1 7PH

15 March 1985

Dear Keith,

INCREASING THE OUTPUT OF ENGINEERS AND TECHNOLOGISTS

You sent me a copy of your letter to Norman Tebbit of 8 March.

I agree with you that it is important for the Government to respond quickly to meet the identified need for additional graduates in shortage subjects. The assessment of Sir Robert Clayton and his colleagues, together with the evidence presented to UGC suggest there will be adequate industrial commitment to the courses which you have put forward for a 1985 intake. They certainly offer good value for money. On that basis, and in view of the time constraint, I am prepared to accept your proposed list for Phase 1.

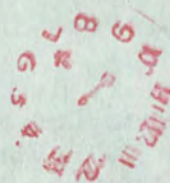
As far as Phase 2 is concerned, I agree with your suggestion that we will need satisfactory evidence of industrial commitment before bids are accepted. I am doubtful about the idea of including the public sector, where a switch has already taken place without additional resources, but I am willing to reconsider should there be a very clear preference on the part of industry for polytechnic graduates.

As to the announcement of the initiative, I am content with either of the options on timing.

I am sending copies of this letter to recipients of yours.

2
W
K

Science + Tech Pt 3
Budget



1955 MAR 1985

CONFIDENTIAL



↓ - only?

DEPARTMENT OF EDUCATION AND SCIENCE
 ELIZABETH HOUSE, YORK ROAD, LONDON SE1 7PH
 TELEPHONE 01-928 9222
 FROM THE SECRETARY OF STATE

AT to [unclear]

P Wyn Owen Esq
 Assistant Private Secretary
 Chancellor of the Exchequer
 Parliament Street
 LONDON SW1P 3AG

14 March 1985

Dear Phillip,

BUDGET DAY PRESS RELEASES: THE SWITCH

Further to my letter of 12 March, I attach a draft of the first of our two press notices - on the switch in HE towards engineering.

I would be glad to know that the Treasury and other interested departments are content with the text. In order to meet your deadline for supplying copies of the final printed version, any amendments will need to be registered with me by 10am tomorrow.

I am copying this to the private secretaries to the Secretaries of State for Energy, Scotland, Wales, Employment, Trade & Industry, and the Minister Without Portfolio, and to Andrew Turnbull (No 10) and Richard Hatfield (Cabinet Office).

Prime Minister.

Yours,

Elizabeth

MISS C E HODKINSON
 Private Secretary

By Monday.

The "switch" is to be announced in the Budget speech, and attached is the text of the Press Notice DES plan to issue later that day, to accompany a written reply. It is worth noting that the concept of a "switch" has now effectively gone. The extra resources for engineering and technology are being found from written existing resources, but not from a clearly identifiable non-vocational budget.

Yes -

Content with the draft press notice?

MEA 14/3

mt.

CONFIDENTIAL

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PLACES IN HIGHER EDUCATION

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CONFIDENTIAL

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INVITATION LIST FOR THE PRIME MINISTER'S MEETING WITH INDUSTRIALISTS

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S Toy Esq
Chairman
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The Rt Hon Lord Weinstock of Bowden FSS
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Sir Austin Bide, BSc FRIC
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R E Utiger Esq CBE
Group Managing Director
TI Group PLC
14 South Street
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Sir Terence Becket CBE, FEng, FIMechE, CBIM, FIMI
Director General
CBI
Centre Point
103 New Oxford Street
LONDON WC1A 1OU

Sir Robert Clayton CBE, FEng, FIEE, FInstP, FRAeS, FIERE, FIEEE
Chairman
Information Technology Skills Agency
c/o CBI Education Foundation
Centre Point
103 New Oxford Street
LONDON WC1A 1OU

Sir Francis Tombs BSC, LLO, FEng, FIEE, FIMechE
N M Rothschild and Sons
St Swithuns Lane
LONDON EC4

+ Robin Duttie Esq CBE
Chairman
Scottish Development Agency
120 Borthwick Street
Glasgow
G2 7JP



cc 10

DEPARTMENT OF TRADE AND INDUSTRY
1-19 VICTORIA STREET
LONDON SW1H 0ET
TELEPHONE DIRECT LINE 01-215 5422
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Secretary of State for Trade and Industry

14 March 1985

The Rt Hon Sir Keith Joseph Bt MP
Secretary of State for Education and
Science
Department of Education and Science
Elizabeth House
York Road
LONDON
SE1 7PH

NBPM
MCA 14/3

D Keith.

INCREASING THE OUTPUT OF ENGINEERS AND TECHNOLOGISTS

Thank you for your letter of March 8th.

2 I agree that it is important for us to make a rapid start to this exercise, and I am therefore content with your proposal that we give immediate approval to bids of clear academic excellence, where industry has also given a high grading for industrial relevance. My reservation is that your proposals include a small number of courses which, though they scored an alpha with the UGC, were rated only beta by industry. Given the very limited amount of money available I would suggest these be left over to phase 2. The reduction would I believe be only 55 students, 20 of them postgraduates, and I would be a little unhappy about giving these approval now in the absence of whole-hearted industrial support.

3 I am content too with your proposals for handling phase 2. Again, I have only one slight qualification, and this is that the Open University is less constrained by the normal academic timetable than the other proposals and I hope they can be given an early decision - though I accept this cannot be within the timescale envisaged for phase 1.

4 I welcome your proposal that we should talk to Sir Robert Clayton and the members of the IT Skills Agency, both about involvement of the polytechnics and about the potential industrial contribution to the Switch generally. I am sure it is important to keep up the pressure on industry and not leave it entirely to the universities, and it would be a demonstration too of our support for the ITSA and of the importance we attach to it.

JH3BLV



5 On the question of an announcement, it would be helpful if this could be sooner rather than later. The UGC have already been told of our decision in confidence, and it is a little awkward that in our dealings with industry (for example, in the context of the IT Skill Shortages Committee) we cannot yet refer to it. I would therefore favour an announcement as part of the Budget statement.

6 I am sending copies of this letter to the recipients of yours.

A handwritten signature in black ink, appearing to read 'Norman', with a stylized initial 'N' and a horizontal line underneath.

NORMAN TEBBIT

Science & Technology : Science Budget A2.



174 MAR 1985



SCOTTISH OFFICE
WHITEHALL, LONDON SW1A 2AU

As

The Rt Hon Sir Keith Joseph Bt MP
Secretary of State for Education and Science
Department of Education and Science
Elizabeth House
York Road
LONDON
SE1 7PH

CF - 1 table 1 sent
the educational file
back down; chd. + 1?

14 March 1985

NBPM

Dear Keith,

INCREASING THE OUTPUT OF ENGINEERS AND TECHNOLOGISTS

Thank you for copying to me your letter of 8 March to Norman Tebbit.

I agree with your general approach to the allocation of the funds which we are making available for this important initiative, but am afraid that I have the most serious difficulty with the almost token recognition of the Scottish universities in your proposed 1985/86 allocations. As you know my contribution to the programme is additional to the substantial funds I am myself providing to the Scottish Central Institutions, and I regard it as absolutely essential that the part those institutions will play in meeting the qualified manpower requirements of Scottish industry in the next few years is adequately matched by the universities. There are also important presentational grounds for a satisfactory Scottish share, particularly when only a week ago we received extensive adverse publicity following the decision by a major US company to establish itself in Ireland rather than Scotland precisely because of the shortage of skills here.

I appreciate that you are planning a phased approach, but the appropriate geographical balance you envisage within the programme must be established at the outset so far as Scotland is concerned. An allocation of funds to support the provision of 15 additional places in 1985/86 at one Scottish university out of 466 places nationally does not begin to recognise either the industrial priorities in Scotland - where the electronics industry's future expansion plans are at risk from manpower constraints - or the need to demonstrate that the Scottish universities' potential is fully understood by the Government. As you will know a question from Lord Mackie of Benshie as to why the Scottish universities have not shared in the funds I am making available to the Central Institutions is down for answer in the Lords on 3 April, and I am sure you will agree that a reply referring to the university programme which had to rely so far as 1985/86 is concerned on a tiny allocation to Heriot-Watt University is unlikely to cut much ice with Scottish industrialists or the universities themselves.

I understand that among the various bids entered by the Scottish universities Strathclyde's proposal for increased intakes to electronic and production engineering was accorded high priority by the UGC but was ruled out from Phase 1 on the grounds that the University's requirement for building works could not be met in time for a 1985/86 student intake. I have now seen Principal Hills' letter of 8 March to Sir Peter Swinnerton Dyer, from which it is quite clear that the University can get these developments underway without insisting on the capital allocations originally proposed.

As I think you are aware, Strathclyde is a technologically advanced university which has excellent industrial links, and it would in my view be wholly unreasonable - and presentationally difficult - if the flexibility shown by Principal Hills over his capital funding proposals were not matched by flexibility on the Government's part in respect of recurrent funding. I must therefore ask you to adjust your proposals to include Strathclyde in the first year. In the case of the very much smaller bid from Stirling, it appears to have been excluded from Phase 1 because it did not receive a sufficiently high grading for industrial relevance. I hope that on reflection you will agree that this is an inappropriate judgement on a university which has in many ways set the pace for liaison with industry, and whose campus Wang chose as the site for its Scottish personal computer factory precisely because of the higher education/industry links that were available. For these reasons I believe that Stirling should also be brought forward to Phase 1. If you can agree to the inclusion of both these universities in 1985/86 I shall be content for the bids from other Scottish universities to be considered for subsequent phases.

So far as the timing of an announcement is concerned I have no strong views, although it would seem sensible that it should be made before the answer in the Lords on 3 April, so that a positive line can be taken at that stage. You will no doubt be circulating a draft of the announcement in due course.

I have 2 additional points. First, I note that you will be giving further consideration to the inclusion in the programme of the public sector in England and Wales in the light of industry's views. I have no objection to this in principle. The output from the technical Central Institutions is well regarded by Scottish industry and my own programme is concentrated on that sector. You will however appreciate that it would be quite inappropriate for my contribution to your programme to be used for the polytechnics, and if you decide to go down this road it will have to be made clear in our public statements that my funding relates to your university programme only. Second, I understand that it was agreed between our officials that the Scottish Development Agency should work as a broker between universities and industry in Scotland in a role analogous to that proposed for the IT Skills Agency in the national framework. The SDA has a good deal of experience in this area and has the confidence of Scottish industry. I should therefore like to reiterate the suggestion that it should be given this task, and, in particular, I think it would be most desirable for the Chairman of the SDA, Robin Duthie, to be invited to attend the meeting planned for 21 May between the Prime Minister and industrialists to encourage support for the programme. By attending this meeting on a par with representatives of ITSA, the CBI and the Engineering Council, Mr Duthie will be in a much better position to spread the Prime Minister's word to the industrial community within Scotland.

I am copying this letter to the Prime Minister, the Chancellor of the Exchequer, the Secretaries of State for Defence, Employment and Wales, the Minister without Portfolio, the Chancellor of the Duchy of Lancaster, the Chief Secretary to the Treasury, Sir Robert Armstrong and Sir Robin Nicholson.

Wms Ws,
George

SCIT + TELH : Budget

11 12 1 2 3 4 5 6 7 8 9 10 11 12

14 MAR 1985

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CONFIDENTIAL



DEPARTMENT OF EDUCATION AND SCIENCE

ELIZABETH HOUSE, YORK ROAD, LONDON SE1 7PH

TELEPHONE 01-928 9222

FROM THE SECRETARY OF STATE

N bpm

The Rt Hon Norman Tebbit MP
Secretary of State for Trade and Industry
1-19 Victoria Street
LONDON SW1

8 March 1985

Dear Norman,

INCREASING THE OUTPUT OF ENGINEERS AND TECHNOLOGISTS

As you know, officials from the Departments concerned have been meeting to prepare recommendations as to how we should allocate the resources identified at the Prime Minister's meeting on 6 February. Following recent correspondence, I think we have agreed a number of objectives. It is essential to secure some increase in intakes to universities this autumn to show that the Government is taking decisive action. But it is equally important to ensure a genuine and tangible commitment by industry to support our plans under this programme. And we have, as you know, adopted your suggestion that institutions should "bid" for resources: hence there is a need to judge proposals according to their relative value for money.

In order to achieve a rapid start on the ground while retaining scope to secure the maximum industrial involvement, I plan - as I said in my letter to you of 28 January - that the programme should have at least 2 phases. I now propose that the first phase of this programme - projects which will lead to additional student intakes this autumn - should be as set out in annex A to this letter. It will be noted that this programme would lead to some 450 additional students admitted to universities this autumn at a total cost of some £3m in 1985/86 (with consequent implications for later years). The spread of academic disciplines involved can be seen from Annex B (to which some marginal changes may result following clarification of bids currently being undertaken by UGC).

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These projects are selected from bids put to the UGC which has awarded those I am recommending a high grading for academic excellence. In a related exercise, industrialists identified by Sir Robert Clayton have also given these selected projects a high grading for industrial relevance. As far as value for money is concerned, it is striking that - through the scope for marginal costing - the average unit cost of places under Phase 1 of the programme will be some £2,300 (recurrent) plus £2,200 (equipment). This compares very favourably with the standard unit cost of some £5,500 and £5,000 respectively.

The need to achieve an early announcement to institutions in phase one necessarily constrains the extent to which we can gain explicit assurances about tangible industrial support. That is one reason why I am proposing that this first phase should be small and based on excellence. Moreover the institutions concerned have shown evidence to the UGC of close and fruitful links with industry and commerce. But we shall nevertheless be making it clear to institutions in this first phase that we shall be looking for evidence from them of the explicit degree of further industrial support and commitment they receive. We shall also, of course, take steps to ascertain whether the extra students anticipated are, in fact, admitted this autumn.

I shall make separate proposals to you and other colleagues in due course about the composition of the second and larger phase of the programme. This will need to take account, inter alia, of the judgements we make about further bids already received from universities, leading to students admissions from autumn 1986 (and also judged to be of academic and industrial quality). We shall also need to agree our approach to the substantial bids from Cranfield and Salford and to a separate bid for innovative course provision by the Open University. These questions will be further considered by officials in the first instance. But I can at this stage say that my approach to phase two will be characterised by an intention to:-

- i. ensure the highest level of industrial commitment consistent with timely decisions;
- ii. ensure an appropriate balance within the programme as a whole as between disciplines; modes of provision; and balance as between England, Wales and Scotland;
- iii. accommodate, if appropriate, the public sector;
- iv. ensure that these resources are also spent with due regard to economy and student yield.

As far as the public sector of higher education is concerned, you will know that it is now likely to be some little while before the Prime Minister meets industrialists to encourage their support for this programme. I therefore propose that, to resolve the question of public sector involvement, we should both meet Sir Robert Clayton, members of the IT Skills Agency, and others to take their views on this important question. At

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the same time we can broach the matter of industrial support for proposals approved under the programme. I have agreed, as you know, that the Agency should explicitly be involved in the procedures for ensuring industrial commitment by projects under phase two. I envisage, at this stage, that allocations under phase two of the programme should be provisional until such time as discussions have been held by institutions with the IT Skills Agency and satisfactory evidence of industrial commitment subsequently provided to the UGC.

We are now ready to make an early announcement about the total size of the programme and its timing is to be discussed at the Prime Minister's meeting next week. If it is decided that reference to it should be included within the Budget statement, I would plan to give fuller details in an arranged Parliamentary answer on the same day. Should it be decided to separate the announcement from other Budget issues, however, I would propose that our announcement be held over until early April at which time we would be in a position both to announce general details of the programme and the institutions to be included in the first phase. Either way, our announcement would need to make clear the importance we placed on achieving industrial commitment to the projects in the programme.

In sum, therefore, I now wish to secure the UGC's formal agreement to the package comprising phase one of this programme as set out above. For this purpose I would welcome your agreement, and that of other departments contributing to this programme, to my proposals for phase one by, at the latest, Friday 14 March.

I am sending copies of this letter to the Prime Minister, the Chancellor of the Exchequer, the Secretaries of State for Defence, Employment, Scotland and Wales, the Minister without Portfolio, the Chancellor of the Duchy of Lancaster, the Chief Secretary to the Treasury, Sir Robert Armstrong and Sir Robin Nicholson.

Emson,

Kear,

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IT 85 PROGRAMME: PROPOSED PHASE I INSTITUTIONS
INTAKES

ANNEX A

UNIVERSITY	DEPARTMENT	Electronics Engineering		Software Engineering and Design		General Engineering		Production Engineering		Applied Physics & Material Science		INTAKE TOTALS	
		UG	PG	UG	PG	UG	PG	UG	PG	UG	PG	UG	PG
BANGOR	Electronic Engineering Science	25										25	-
BATH	Electrical Engineering	7										7	-
BIRMINGHAM	Engineering Production " " "							10	20			35	20
	Electronic and Electrical Engineering (with Computer Science)	25											
BRADFORD	Electrical Engineering " " "	30	20									30	20
CAMBRIDGE	Engineering					30						30	-
EAST ANGLIA	Information Systems			25								25	-
ESSEX	Computer Science			12								12	15
	Electrical Engineering Science		15										
HERIOT-WATT	Mechanical Engineering							15				15	-
HULL	Electronic Engineering	12										12	-
KENT	Computing Laboratory			10								10	-
LANCASTER	Engineering					10						10	-

INTAKES

UNIVERSITY	DEPARTMENT	Electronics Engineering		Software Engineering and Design		General Engineering		Production Engineering		Applied Physics & Material Science		INTAKE TOTALS	
		UG	PG	UG	PG	UG	PG	UG	PG	UG	PG	UG	PG
IMPERIAL	Mechanical Engineering							10				10	-
NOTTINGHAM	Production Engineering and Production Management							20				20	-
SALFORD	Electronic and Electrical Engineering	20										20	-
SURREY	Electronic and Electrical Engineering " " "	20	25									20	25
SUSSEX	Electrical, Electronic and Control Engineering and Computer Science	15										15	-
SWANSEA	Electrical and Electronic Engineering Metallurgy and Material Technology) Mechanical Engineering)	20						10				30	-
UMIST	Electrical Engineering and Electronics	20										20	-
WARWICK	Engineering					20						20	-
YORK	Computer Science			20								20	-
TOTAL		194	60	67	-	60	-	65	20	-	-	386	80
												<u>466</u>	

ANNEX B

IT 85 PROGRAMME

Phase 1

	<u>U/Graduate</u>	<u>P/Graduate</u>
Electronics Engineering	194	60
Software engineering and Design	67	0
General Engineering	60	0
Production engineering	65	20
Applied Physics & Material Science *	0	0
TOTAL	386	80

* There are eligible bids for Phase 2 in this category



10 DOWNING STREET

Note for file.

Elizabeth Hodgson
rang back to confirm that
Michael Harcourt was ^{initially}
contacted to send the letter out
to industrialists to coincide with
the announcement. They
are working a revised draft.

We need to ensure letter
does not go out before Parliamentary
Statement.

MMA 7/3



Mfj
(ECL:12)

10 DOWNING STREET

From the Private Secretary

6 March 1985

We had a word earlier today about your letter to David Barclay of 28 February, which outlined proposed arrangements for an announcement on the Switch programme, and for a meeting of industrialists with the Prime Minister to accompany that announcement.

It may be worth noting, mainly for the sake of copy recipients, the Prime Minister's views on those proposals, which I know Tim Flesher has already passed to you. On the announcement, she commented that it would be better if the announcement were made shortly after 15 March to avoid overwhelming its impact by the rest of the Budget. She also felt that the meeting with industrialists would in any case need to be set for a date further ahead if there were to be a good attendance, and that it need not take place at the same time as the announcement itself.

You are now considering what date you might prefer for an announcement if it is decided not to go for 19 March, and this will no doubt be discussed further at Monday's meeting on the timing of announcements generally. So far as the meeting with industrialists is concerned, Caroline Ryder has as you know now fixed this for 21 May at 10 a.m. You are meanwhile preparing a revised draft letter of invitation for us.

I am copying this letter to Rachel Lomax (HM Treasury), Callum McCarthy (Department of Trade and Industry), David Normington (Department of Employment) and Leigh Lewis (Minister without Portfolio's Office).

(Mark Addison)

Miss Elizabeth Hodkinson,
Department of Education and Science.

056



10 DOWNING STREET

From the Private Secretary

6 March 1985

Dear Elizabeth

We had a word earlier today about your letter to David Barclay of 28 February, which outlined proposed arrangements for an announcement on the Switch programme, and for a meeting of industrialists with the Prime Minister to accompany that announcement.

It may be worth noting, mainly for the sake of copy recipients, the Prime Minister's views on those proposals, which I know Tim Flesher has already passed to you. On the announcement, she commented that it would be better if the announcement were made shortly after 15 March to avoid overwhelming its impact by the rest of the Budget. She also felt that the meeting with industrialists would in any case need to be set for a date further ahead if there were to be a good attendance, and that it need not take place at the same time as the announcement itself.

You are now considering what date you might prefer for an announcement if it is decided not to go for 19 March, and this will no doubt be discussed further at Monday's meeting on the timing of announcements generally. So far as the meeting with industrialists is concerned, Caroline Ryder has as you know now fixed this for 21 May at 10 a.m. You are meanwhile preparing a revised draft letter of invitation for us.

Yours Sincerely
Mark Addison

(Mark Addison)

Miss Elizabeth Hodkinson,
Department of Education and Science.



CCND

SCOTTISH OFFICE
WHITEHALL, LONDON SW1A 2AU

The Rt Hon Sir Keith Joseph Bt MP
Secretary of State for Education and Science
Elizabeth House
York Road
LONDON SE1 7PH

6 March 1985

Dear Keith,

SWITCH TO ENGINEERING AND TECHNOLOGY

At the meeting chaired by the Prime Minister on 6 February I made a conditional offer of the order of £1m in each of the next three financial years in order to help fund the proposed switch of resources within the university sector towards engineering and technology.

As you know I am normally unwilling to transfer resources from within my Scottish budget to support programmes which are supposed to cover Great Britain as a whole when specifically English programmes are not being asked to contribute. Moreover I have already announced my decision to make a substantial switch in resources within the Scottish block to promote similar courses within the Central Institutions for which I am responsible. Nevertheless I am prepared, in the light of the willingness of other Ministers with "economic" responsibilities to contribute to the switch, and because of the high priority I give to this, to confirm my offer to contribute £1m (which I will find from my Industry programme) in each year of the current PES round.

I am copying this letter to the Prime Minister, the Chancellor of the Exchequer, the Secretary of State for Trade and Industry, Departments of Employment, Energy and Wales, the Chancellor of the Duchy of Lancaster, the Chief Secretary to the Treasury, the Minister without Portfolio, Sir Robert Armstrong and Sir Robin Nicholson.

Yours ever,

George

Science & Tech

PT 2 Budget



17 MAR 1985



case

DEPARTMENT OF TRADE AND INDUSTRY
1-19 VICTORIA STREET
LONDON SW1H 0ET

TELEPHONE DIRECT LINE 01-215 5422
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JU71

Secretary of State for Trade and Industry

5 March 1985

The Rt Hon Sir Keith Joseph Bt MP
Secretary of State for Education & Science
Department of Education & Science
Elizabeth House
York Road
London SE1

NB7M
MBA 6/3

D Keith,

Thank you for your letter of February 28.

As regards the polytechnics, I am content with the compromise you propose. My concern was and remains twofold. First, if we ignore the polytechnics we would miss a most valuable source of graduates whose courses have proved in many cases more relevant to industry's needs than those of the universities. Second, I was conscious that the polytechnics had put forward proposals to John Butcher's Skills Shortages Committee, and will need to feel that their willingness to join this exercise is fully accepted and encouraged; the alternative may be damaging recriminations. However, I accept that your proposals which we discussed on February 6 were intended to relate to the universities only, and I am ready therefore to agree that we should rely on industry's advice in deciding which, if any, polytechnics should be included within the scope of the exercise.

On the procedural front events have, as you say, moved on and I am content with the arrangements that have been made. I gladly accept your suggestion that a member of the IT Skills Agency should be involved in the second phase of the programme, and my officials will be in touch with yours.

I am sending copies of this letter to the recipients of yours.

Science & Tech

PT2
Budget

15 MAR 1985

15 MAR 1985



→ TF CCND

DEPARTMENT OF TRADE AND INDUSTRY
1-19 VICTORIA STREET
LONDON SW1H 0ET
TELEPHONE DIRECT LINE 01-215 5422
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Secretary of State for Trade and Industry

4 March 1985

Rt Hon Michael Heseltine MP
Secretary of State for Defence
Ministry of Defence
Main Building
Whitehall
London SW1

*Not pleased h.p.u. Treasury
are keen that this should not be
picked up by MoD, since they
believe Dept will have indirectly
less need for these skills in future.
(Michael Fuller in line)
Mar 11/3 |*

D Michael,

SKILL SHORTAGES

I am writing about a problem which concerns us both: the serious, and increasing, shortage of skilled people in high technology industries in general, and in what may broadly be called the "information technology" industries in particular.

2 I think you know that, early last year, we in the DTI became sufficiently concerned at the growing evidence of skill shortages in the information technology field to set up a committee under John Butcher to look into the whole question and to make recommendations for action. The Committee published its first report last July, and concluded both that the market could absorb significantly more IT-skilled graduates than were currently available, and that additional graduate manpower would be required up to the end of the decade and probably beyond. I enclose a copy of this report in case you have not seen it. A second report, on shortages below graduate level, was published in January, and a final report will appear shortly. Also, the Engineering Council issued a policy statement in February of last year calling for an increased output of engineers and technologists.

3 Some action has already been taken. The individual companies on John Butcher's committee have taken the initiative in proposing a new "partnership for change" with the higher education system. They have been instrumental in setting up an "Information Technology Skills Agency", under the aegis of the CBI Education Foundation, which will both act as a focal point for interpreting industry's needs to the academic world and co-ordinate positive help in the shape of donations of equipment, loan of visiting lecturers, offering increased undergraduate sponsorship and opportunities for undergraduate industrial experience, etc. On the Government side it has recently been agreed (though no announcement has yet been made) that my Department, together with DES, DEM and the Scottish and Welsh offices, should contribute to a

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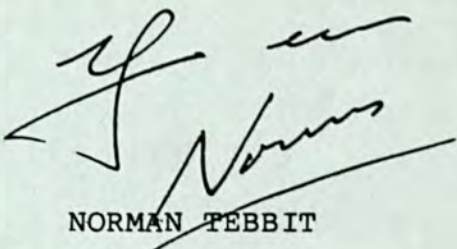
package of support totalling some £42 million over the three years 1985/6 - 1987/8 to increase the number of undergraduate and post graduate places at higher education institutions. My own Department's contribution will be £2½ million in 1985/86 and £5 million in each of the two subsequent years. We also expect substantial help from industry.

4 Some of the major defence contractors in the high technology field have, I know, impressed on you personally the difficulties they are finding in recruiting the skilled manpower necessary to carry out their defence commitments, and I very much welcome your interest in this question. You will be very conscious of the need for the defence industries to have access to the right number and quality of technology trained graduates if they are to fulfill their commitments. Defence accounts, of course, for over half the Government funded R&D in the UK, and I am sure industry is right in its view that skill shortages are acting as a brake on progress in the defence field just as much as in the civil field.

5 I would like therefore to seek your support for the initiative we and other Departments, in conjunction with industry, are taking to tackle the problem. I believe that, in view of the substantial extent of Defence R&D spend, you may feel it right for that support to be in financial terms. Even if it is not of such a size to be commensurate with the benefit which flows back to defence industries as users of IT skills, I do think it will be an important signal, both of the co-operative effort across Government, and also to the defence industry.

6 I hope very much that you will be able to agree to this. It would be helpful if you could let me and Keith Joseph know your reaction fairly quickly, since we are anxious to make an early announcement of the Government package of support that has been agreed.

7 I am sending copies of this letter to the Prime Minister, to the Chancellor of the Exchequer and Chief Secretary, to the Secretaries of State for Education and Science, Scotland, Wales and Employment, the Minister without Portfolio, Sir Robert Armstrong and to Sir Robin Nicholson.



NORMAN TEBBIT

JH1CAI

IT Skills Shortages Committee

First Report

**The Human Factor —
The Supply Side Problem**

Information Technology Skills Shortages Committee: First Report

Summary and Conclusions

There is intensifying national concern about shortages of skilled IT manpower and the loss of UK market share in the rapidly growing IT sector.

The Government established a Committee under Mr John Butcher MP, Parliamentary Under Secretary of State at the Department of Trade and Industry, to explore the extent of any problems and to propose action to tackle them.

In this its first Report, the Committee assesses the demand for and supply of IT skilled manpower at graduate level; and proposes an outline plan of action to deal with any shortfall. A subsequent report in the autumn will consider skills in the technician area and progress on the points for action.

Despite the difficulties inherent in attempting precise quantification of the additional IT skilled graduate manpower required, the Committee considered that **the market could comfortably absorb more graduates with the requisite skills now**; and that given the rates of growth in the IT areas predicted by industry and commerce, additional graduate manpower with IT skills above and beyond the expansion already planned will be required for the rest of this decade and possibly beyond.

The Committee believes that the risks of inaction, measured in terms of deteriorating economic performance, transcend the current uncertainties about the precise size of the requirement; and that action is therefore needed to set in place the means of responding to industry's demands as these develop.

The Alvey Directorate estimate a shortfall of 1,500 graduates now and 5,000 by 1988. These figures are themselves open to debate but, whatever the precise figures, it is clear that there are shortages and action is therefore needed now to increase the number of first-degree places in the appropriate disciplines, the number of IT conversion places on offer to graduates, and to expand the role of upgrading and updating courses. Distance learning should play an increasing role in satisfying the requirements of students and industry for IT skills education and training. A campaign to bring back British and acquire experienced foreign expertise should be considered.

Because of the urgency of the situation and the distinctive features of the constraints involved including availability of

teaching staff, specialised equipment and accommodation, the Government is looking for a **new partnership with industry** to help secure the expansion in manpower supply which industry requires.

Representatives of industry have put forward an imaginative series of proposals which could constitute a plan of action to help overcome the constraints on the education system responding to industry's demands. These proposals will be developed into a detailed programme of targetted action.

Section 1 — Introduction

Information technology is the fastest growing industrial sector worldwide. The United Kingdom industry is growing at 8 per cent per annum compared with a world average rate of 15 per cent per annum. In some sectors such as semi-conductors and data communications the world growth rate is 20 per cent. Manpower constraints are said to be losing market share for the UK. A number of surveys have highlighted particular pockets of difficulty (eg. in the UK semi-conductor industry¹) and a number of proposals have been submitted to Government by representatives of industry calling for an investigation and for action.

2 The Government itself has already acted to increase the supply of manpower with IT skills; and consideration is being given to a further 'switch' towards engineering and technology in the Higher Education sector. Furthermore, the main thrust of the Adult Training Strategy announced in the White Paper 'Training for Jobs' (Cmnd 9135) is directed towards securing an adequate supply of people with up-to-date skills to meet the demands of new technology. The Government has also recognised that if industry's perceptions of shortages of skilled IT manpower at graduate level are correct, further action beyond that already planned or under consideration would be required as a matter of urgency.

3 On 4 April representatives from industry, education and Government met under the Chairmanship of Mr Kenneth Baker MP, Minister for Information Technology, and decided that Mr John Butcher MP, Parliamentary Under Secretary of State at the Department of Trade and Industry, should chair a Committee to explore the scale of the problems and to recommend any necessary action to address them urgently.

4 The Members of the Committee were drawn from the sectors represented at the April meeting — a full list is at Annex I. On 13 June, the Committee agreed the terms of reference set out in Annex II. These are to try to establish the likely demand for and supply of IT manpower in the short, medium and longer term; and to recommend action to resolve any imbalances. **The Committee decided that despite difficulties of collecting and analysing hard information in what is a diffuse and rapidly developing industrial field, appropriate action should not be delayed where specific problems were identified.** The Committee's recommendations for action should dovetail with the Government review of the 'switch' to engineering and the new technologies in the Higher Education sector.

5 The Committee recognised that additional information about the demand and supply of manpower with IT skills, particularly at higher technician and technician levels, would be difficult to acquire within the deadline agreed for publication of its first Report — the end of July 1984. This Report, therefore, reflects the Committee's overview of the supply of graduate/professional manpower with IT skills; and some initial proposals for action. A second Report, in the Autumn, will be issued on shortages in the technician areas and on progress with the points for action from this Report.

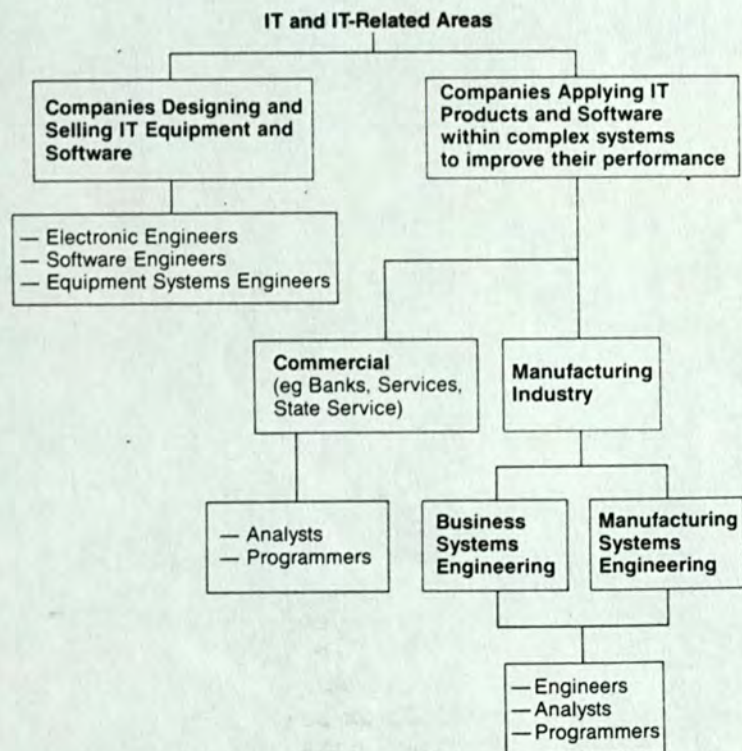
Section 2 — The Demand for IT Manpower at Graduate/Professional Level

6 To assess the demand for graduate manpower with IT skills it is necessary first to identify the **source** of the demand; the **baseline** of employment; and the **assumptions about growth** which are likely to condition demand. It is then possible to examine the **type of skills** likely to be required.

Sources of Demand

7 The pace of technological development in the field of Information Technology and its diverse applications makes precise definitions of what constitutes the 'IT industries' difficult. The first part of Annex III describes in general terms the main areas of current concern. Nevertheless, it is beyond doubt that IT is now all-pervasive; few sectors of industry and commerce are not affected by it. The demand for manpower with IT skills — which are described in the second part of Annex III — comes from a wide cross-section of industrial and commercial users and not only, or even perhaps mainly, from the 'IT suppliers' themselves. The Committee, therefore, focussed on the key skills in demand at graduate level irrespective of the particular area of economic activity where they would be put to use.

8 The relationship between IT suppliers, IT users and IT-based organisations, and the skills they require, is illustrated in the following diagram submitted by Professor Parnaby:



The requirement for IT manpower with differing educational backgrounds will be strongly influenced by the different rates of growth of the sectors described above.

Size of the IT Graduate Base

9 There is no agreed set of definitions enabling a precise assessment of the size of the IT graduate base to be made. There is a variety of information which sheds light on parts of it. A report² based on statistics compiled by the Engineering Industry Training Board, which excludes areas of relevant employment outside the Board's scope, puts employment in **electronics** in 1983 at 331,000. Within that total, the number of scientists and technologists stood at over 30,000 while managerial staff, most of whom are likely to be graduates, numbered about 21,000. The EITB definition suggests therefore that at least 50,000 graduates are employed in the electronics industry itself. The Computing Services Industry Training Council (COSIT), which covers the **computing services sector**, in evidence to a House of Lords sub-Committee recently³ estimated that some 35,000 staff, the majority graduates, were directly employed in this sector; and that a similar number provided computing services within or as contractors to user companies. Thus a conservative estimate would suggest that somewhere in the region of 100,000 graduates — not necessarily all specialists — are employed in these two areas, electronics and computing services.

Growth in Demand

10 Information technology and associated industries have enjoyed rapid growth in recent years. As a consequence there has been a rapid increase in the numbers of graduates employed across the range of IT manufacturers, IT service industries, and users.* This is expected to continue over the rest of the decade as more organisations in manufacturing industry and the service sector employ the products of the IT industries, and as the IT sector becomes the lead sector in the economy at large. Evidence presented to the Committee by its industrialist members suggests that their companies, along with many others in the IT industries, are planning on the basis of anticipated growth in output of around 20 per cent per annum over the rest of the decade. One major company (Plessey) estimate that graduate recruitment planned by eight major organisations in the IT area will be over 4,000 in 1984, and that this will grow by 10 per cent per annum. Another company, Hewlett Packard, expects its new graduate recruitment to grow from 1,250 in 1984 to over 3,000 by 1988. A similar picture is painted by other major employers of IT-skilled manpower.

General Trends Affecting Demand

New technology

11 The EITB figures reveal an increase in graduate level manpower in the electronics industry between 1978 and 1983 while the number of technicians declined. Technological change is introducing new tasks which only graduates can perform; and in some areas is making it possible for one graduate to perform tasks previously carried out by several technicians. This trend is likely to strengthen, adding further to demand for graduates.

COSIT estimate that the **Computing Services** sector in the UK has sustained a revenue growth of 20 per cent per annum since the mid-1970s, and that the work-force has expanded by 7-8 per cent per annum over the same period. EITB figures⁵ report a rise in output from the **electronics industry** of 35 per cent between 1978 and 1983, with an increase in the number of scientists and technologists of over 40 per cent from 21,000 to 30,000. A recent study by the Policy Study Institute⁶ estimates that the number of **engineers with micro-electronics expertise** rose 75 per cent from 26,000 in 1981 to 46,200 in 1983.

Demand for Experienced Graduates

12 In addition to the demand for new graduates, several reports have suggested an even greater demand for experienced IT manpower⁷. In the case of the semi-conductor industry, the greatest need was for graduates with 2-7 years' experience⁸. These reports reflect the low recruitment in the past decade and illustrate the problems of effective manpower planning and the part that industry ought to play in giving clear signals to bright young people who have a choice of attractive career options. Firms are increasing new graduate intake to compensate for the lack of experienced staff, and an element of substitution is clearly possible. By itself, however, the supply of new graduates cannot provide a complete solution to this problem. One suggestion approved by the Committee was that there should be a determined effort to lure back experienced British IT manpower currently working abroad; and to acquire non-British skilled IT manpower, for example through imaginative Joint Ventures between larger companies and individual IT entrepreneurs and product developers involving stock option schemes.

Specific Skills Likely to be in Demand

13 Graduates with a background in electronic engineering and computer science are in heavy demand now and employers believe this will continue to be the case in the future. The skills learned within these disciplines are regarded as 'core' skills to which employers can add specific training for particular IT tasks. Physicists and mathematicians are also recruited, in some cases possibly where graduates with the preferred skills are not available; in other cases they are equipped to provide skills much in demand, eg software engineering.

Demand for New Graduates

14 The 'First Destination Statistics' show the proportions of new graduates in different disciplines finding employment within six months of graduation. As such they provide an indication of the strength of demand for graduates with different educational backgrounds. 1982 was the last year for which complete figures are available. The figures⁹ show that 90 per cent of university graduates in electrical/electronic engineering, and 86 per cent of polytechnic graduates in this subject, found employment within 6 months. The equivalent percentages for maths and computer science were 83 per cent and 84 per cent. (There were no precisely comparable figures for physics.) It should of course be noted that some graduates found employment in industries not requiring IT skills — see paragraph 17 below. A further quick survey of graduate requirements among 9 major companies was carried out by Mr T G P Rogers, a member of the Committee. The results are set out in full in Annex IV, but clearly the disciplines expected to be most in demand in the period from 1984-1989 were electronic engineering and computer science. The view of employers consulted was that graduates in these disciplines were also likely to be in greatest demand in 1989.

Growing Need for Multi-disciplinary IT Skills

15 Technological convergence requires a convergence of skills. Within electronic engineering and computer science, therefore, demand is growing for graduates with more flexible skills. As technology advances, attention is shifting increasingly away from concentration on either hardware or software towards a combination of skills in both — software and systems engineering. Another important area is manufacturing

systems engineering, which will typically need to embrace electronic engineering, computing, production/process engineering and business applications. As advanced manufacturing technology develops and is adopted more widely, so will demand grow for graduates with a combination of these and other skills. Other specific requirements brought to the notice of the Committee include telecommunication engineers, integrated circuit designers, microwave (including radio frequency) engineers and artificial intelligence engineers. The rapid development of technology in these areas, encouraged by programmes such as ALVEY and ESPRIT, will add to the demand for graduates with the appropriate advanced technology backgrounds along with the rapidly changing disciplines of the mechanical or production engineer.

16 These considerations point to the need for a high proportion of first degree courses to be broadly based and to have a considerable degree of flexibility in their composition and structure. Graduates in physics and mathematics are still likely to be essential for contributions at the frontiers and in software engineering in particular. The UGC and NAB assisted by the advice of such representative organisations as the Engineering Council will have an important part to play in promoting courses which respond to industry's clearly-signalled requirements.

Section 3 — The Supply of Graduate IT Manpower

17 The main sources of supply of graduate level IT manpower are **new graduates** with a suitable educational background; **post-graduates** undertaking conversion courses; **upgrading** of existing manpower, including those from non-IT backgrounds; and **updating** of those with broadly relevant skills.

i New Graduate Output and Deployment

There is no single IT subject as such but it can be assumed that the most directly relevant subjects are electrical/electronic engineering, maths/computer science, and physics. Some graduates with IT skills will be drawn from other subjects, and many graduates in these 3 subjects could not undertake IT work without further training.

The total output of the three 'relevant' subjects in 1982 (the latest year for which full figures are available) was as follows:

New First and Higher Degree Output : 1982

	UK	Overseas
1 Electrical & Electronic Engineering		
Univ/First Degree	1909	526
Poly CNAA*/First Degree	591	175
Other CNAA/First Degree	216	64
Univ/Higher Degree	307	382
2 Maths/Computer Science		
Univ/First Degree	3290	497
Poly CNAA/First Degree	589	115
Other CNAA/First Degree	194	38
Univ/Higher Degree	528	285
3 Physics (including Maths with Physics)		
Univ/First Degree	2314	143
Poly CNAA/First Degree	92	10
Other CNAA/First Degree	17	2
Univ/Higher Degree	538	199

**CNAA is the validating body for first degrees taken in the non-university higher education sector (eg polytechnics, institutes of higher education).*

*Source: First Destinations Statistics
CNAA Annual Report 1982*

Almost all overseas students return home after graduation or further study. Higher degree graduates are not properly a net addition to output of first degree graduates because the great majority, except perhaps for computer scientists, are likely to have taken a first degree in the same subject as their postgraduate qualification. As a broad approximation, therefore, new graduate output can be taken as the sum of university and CNAA first degrees. (It should be noted that output in these subjects has increased substantially since 1982, particularly that from polytechnics.)

Detailed first destinations information suggests that the great majority

of university and polytechnic electrical engineering, maths, computer science, and physics graduates enter employment in the UK labour market (such information is not available for other (non-polytechnic) CNAAs graduates). At present very few UK graduates/post-graduates start work abroad. The main potential losses were through subsequent training in non-related skills (but including teaching in schools) and work in non-IT employment. Some are also attracted abroad after gaining useful experience in the UK. Training outside the subject meant a loss of perhaps 5 per cent in electrical engineering and 10 per cent each in the other subjects. Very roughly then the numbers of university and polytechnic graduates entering employment were:

Electrical and electronic engineering : 2400
 Maths/Computer Science : 3500
 Physics : 2200

By type of UK employment the allocation was roughly as follows (percentages):

	1	Of which:		2	3
	Direct Science or Engineering Employment*	a Eng R&D	b Scientific R&D	Computing, Systems Anal.	Other
Electrical & Electronic Engineering	89	75	7	3	8
Maths/CS	11	4	6	56	34
Physics	60	23	32	13	26

*including scientific/engineering support work.

By sector of employment, again roughly, the deployment was as follows (percentages):

	Engineering and allied	Public Uts, transport, comms	Other Industry	Commerce	Other*
Electrical & Electronic Engineering	67	10	6	3	15
Maths/CS	27	5	8	41	20
Physics	39	6	15	11	28

*including higher education

Growth in supply of new graduates

These figures suggest that of the total output of about 8,100 new university/polytechnic graduates entering employment in 1982, some 6,000 entered employment in science and engineering, or computing and systems analysis. To this should be added graduates of other (non-polytechnic) CNAAs first degree courses — perhaps another 300-400 graduates entering relevant employment.

The most recent DES projections showing university/CNAA graduate output up to 1989/90 are set out in Annex V. These projections take account of current trends in student enrolment, demographic trends, and policy decisions likely to make an impact on the figures (eg the recent NAB planning exercise). These figures show output in electrical/electronic engineering rising from 2.9 thousand in 1981/2 to 3.6 thousand in 1989/90 (a rise of about 24 per cent); in mathematics from 2.5 thousand to 3.6 thousand (about 44 per cent); computer science from 1.8 to 2.9 thousand (about 61 per cent); and physics from 2.4 to 2.9 thousand (21 per cent). Total output in these subjects in 1989/1990 is expected to be 13,000. (It should be noted that on the basis of present policies most of the increase will take place in the CNAA sector.) Allowing for wastage and diversion, a plausible assumption might be that between **8,000 and 10,000** graduates in these disciplines will enter the IT Industries in 1989/90 on current plans.

ii **Graduate Conversion**

Under the DES' IT in HE initiative (which commenced in 1983/84) post-graduate conversion courses will produce around 1,000 IT practitioners up to 1985/86, after which the programme will become part of the normal HE baseline. Some 200 students per year undergo graduate level conversion courses in electronic engineering under the MSC's TOPS programme. In addition, a number of companies operate IT conversion programmes for graduates in non-IT disciplines. It should be noted that not **all** of the above will be a net addition to IT manpower as some students will be undertaking conversion courses closely related to their first degree subject.

iii **Upgrading**

The MSC's Training Opportunities Programme (TOPS) provides a significant resource for upgrading training in IT skills. Some 12,500 trainees annually undertake training in new technology, computer skills or other technician areas. Of those about 6,000 trainees take courses between technician and post-graduate levels — critical for economic growth. A discrete part of the TOPS programme concentrates on developing and pump-priming post experience courses in the newest technology, especially IT. Throughput on such courses is currently about 400 trainees (Annex VI provides details of the relevant courses).

iv **Updating**

It is difficult to estimate the number of employees with relevant backgrounds undertaking in-house updating in IT skills. The main responsibility lies with employers for securing the full potential from this source of IT manpower. We are aware of some companies carrying out major schemes. Under the DTI's Microelectronics Applications Project (MAP) training scheme some 30,000 places are available annually, most at graduate level, of short duration, and aimed at practising engineers requiring additional skills.

Further Information about Demand and Supply

18 The Committee hopes to provide additional information about demand for and the supply of manpower with IT skills in its second Report. Further work is however required to inform longer-term policy

decisions in this area. The Committee therefore endorses the proposal to commission the Institute of Manpower Studies to conduct a detailed survey which will address future trends and constraints, focussing where possible on a five-year horizon and providing a better data base on IT skills than is available at present.

Section 4 — Graduate IT Skills: The Balance Between Demand and Supply

19 There is no agreed data base defining skill shortages. But the steady accumulation of survey material and employer evidence points firmly in one direction as the following examples illustrate:

i A survey conducted by the **National Electronics Council**¹⁰ covering 18 of its members employing qualified IT/electronics staff around the end of 1983 found that vacancies for graduates had risen by 25 per cent between 1983 and 1984, with not all of the 1983 vacancies being filled. Electronics vacancies were up by at least 11 per cent, computing science by at least 28 per cent. The shortage of high quality recruits, particularly those with experience, was a feature of the responses. Software was a commonly-reported problem area.

ii In their evidence to the House of Lords sub-Committee¹¹ **COSIT** commented that there were significant shortages of experienced staff in the areas of programming, systems and technical management.

iii **Plessey** have commented that they would have recruited an additional 700 engineering graduates in the past three years had they been able to. They anticipate a gap of 12.5 per cent between demand and supply for a number of years to come.

iv **Hewlett Packard** reports a shortage now of systems designers and expects serious skill shortages in the latter part of the decade.

v A **National Computing Centre** survey¹² estimated that the total number of computer professionals in commerce and industry falls 8 per cent short of existing demand and will be 25 per cent short in two years.

vi **The Policy Studies Institute** survey¹³ suggested that some 21,000 extra engineers with micro-electronics expertise were wanted.

Further Evidence

20 Additional evidence suggesting skill shortages is to be found in the information available about **pay levels**, the **employment prospects** for new IT graduates and **sponsorship**. Although comprehensive data about **pay** tends to lag behind events, numerous individual reports to the Committee suggest a very rapid upward movement in pay levels, particularly for those with IT skills in key areas and especially for experienced staff.

21 The **employability** of new graduates with IT skills provides indirect evidence of shortages, particularly for electronic engineers and computer science graduates. Some evidence to the Committee about vacancies for new technical graduates comparing this year to last year indicates an increase of 181 per cent in all such vacancies with an

increase of 112 per cent for computer science graduates and 115 per cent for physics graduates.

22 The increase in the number of students being **sponsored** by firms also points in the same direction. Companies are seeking to secure a sure supply of scarce graduates with IT skills.

23 The Committee has reviewed this information. Incomplete though it is, the message it conveys is clearly **that the market could absorb significantly more graduates with IT skills than are currently available to it**. The longer the delay in meeting the demand, the greater the damage to the economy. The Alvey Directorate assess the shortfall of new graduates in 1984 as about 1,500. Given current expectations by employers about growth in the IT and related industries, **the Committee believes that graduate manpower with IT skills additional to that already projected will be required during the rest of the decade, and possibly beyond**. The Alvey Directorate believe that some 5,000 additional graduates will be required by 1987/88 with the bulk of the requirement being split between electronics and computing science, with physics, mathematics and other engineering making up the remainder.

24 Whatever the precise figures, it is clear that the shortages of skilled manpower are damaging to individual firms and to the nation. Without the necessary supply of skilled manpower, companies cannot be expected to keep up with overseas competitors across the whole range of information technology from the microchip to the satellite. They will not be able to apply rapidly-changing state of the art production methods nor maintain the momentum of their Research and Development at the frontiers of knowledge. With the expenditure of substantial amounts of both public and private funds on programmes such as Alvey it would clearly be wasteful if the technological gains resulting from such investment could not be properly exploited because skilled manpower was lacking.

25 All members of the Committee agreed on the existence of shortages of IT skilled manpower, although estimates of the size of the shortfall vary. The Committee believes that inaction in the face of a balance of payments deficit of over £2 billion in IT products, and in the face of continuing shortages of skilled IT manpower, is unacceptable.

Section 5 — Measures to Increase the Supply of Graduates with IT Skills within the Existing Framework

Meeting Immediate Needs

26 Given the Alvey Directorate estimate of a 1,500 shortfall now rising to 5,000 by 1988, the Committee reviewed the mechanisms currently available, and the constraints; and suggested some additional proposals for action.

27 The supply of graduate manpower with IT skills can be increased through action in the areas of **first degree provision, post-graduate conversion, in-company training, and upgrading and updating**. The use of distance-learning techniques can play an important role in enabling supply to be increased in a cost-effective manner. Action in these areas will yield results over different timespans. Increased provision of first degree courses introduced in the 1985/86 academic year will not yield extra graduate manpower until 1988, whereas conversion would produce results in a year or two and retraining perhaps even sooner. A combination of measures is therefore necessary to meet industry's immediate and continuing requirements.

28 In the light of current estimates of demand, and of representations from individuals and organisations, including the Engineering Council¹⁴, DES Ministers are currently considering with their colleagues the scope for creating additional **first degree** places in universities and polytechnics in technological disciplines currently in high demand, particularly electronic engineering and computing science. This tends to be described in terms of a "switch" from other subject areas, but complex questions of staffing and other resources arise which are not further discussed here. The Committee believes that its examination of the problem of IT skills shortages endorses the case for increased output of graduates in IT subjects and has indicated those areas in which the extra provision is required. But the Committee recognises that extra first degree places alone will not solve some of the difficulties identified.

29 The value of existing **conversion courses** for graduates is widely recognised. They can take the form of highly specialised courses for those from cognate disciplines, such as the physical sciences and other forms of engineering, or more general courses for those with less relevant degrees, which nevertheless enable people to apply IT effectively. In the short term, the conversion of those with less relevant degrees helps to meet unsatisfied demand, but in the longer term emphasis should turn to highly specialised courses for those with relevant backgrounds. Because the lead time is short, one-year conversion courses have a continuing and significant part to play in a robust strategy. Although the number of students emerging from conversion courses under the DES' IT in HE initiative is so far small, preliminary indications are that such students are readily employable. The case for extending the initiative seems strong and is under consideration by Ministers as a complement to extra first degree provision. Some companies are running or planning to introduce

conversion courses for technological and non-technological graduates in IT skills, and others recognise that more could be done in this area. The NAB have proposed extending the existing conversion courses available under the IT in HE initiative. This could be accomplished speedily. The relevance of the NAB proposals to industry's requirements is being considered as a matter of urgency.

30 Action is already under way in the areas of **upgrading** and **updating** through such schemes as TOPS and MAP. These might be extended, or better utilised. **In-house** training, including schemes in conjunction with educational institutions for both sponsored and unsponsored students, is often used to enable new graduate recruits to become fully effective.

31 The use of **distance or open learning** techniques will play an increasingly important role in the provision of IT skills. At graduate level a number of different initiatives are already in hand, but two worthy of particular mention are a Science and Engineering Research Council (SERC)/Open University scheme to provide two Masters Courses, one in manufacturing and the other in the industrial application of computers; and a tutored distance learning initiative is being discussed by a number of major industrial users of IT skilled manpower with the Alvey Directorate and the MSC to develop and offer a series of course modules in modern electronics and IT skills. Such courses should be attractive to companies who would find difficulty in releasing scarce staff for extensive periods of external study and could offer a speedy, partial solution to the problems under consideration. The Committee supports such innovation, particularly where it involves the use of IT to increase the cost-effectiveness of learning. The Tutored Video Instruction technique also holds out considerable promise in the area of updating.

32 The measures described above are making some early impact on the supply of IT skilled manpower. But there are a number of **constraints** inhibiting efforts to expand numbers and improve quality through conventional measures.

33 The first constraint is **financial**. Electronic engineers and computer scientists are expensive to train, and the resource costs of providing additional first degree and conversion places in higher education will be substantial, as will the opportunity costs of getting things wrong. In their further consideration of the scope for such expansion, therefore, Ministers are likely to take particular account of the extent to which costs might be shared by support from those sectors of the economy with the greatest manpower demand.

34 The second serious constraint is the availability of **teaching staff**. With the highest salaries currently commanded by experienced staff in industry, the recruitment of teaching staff is already a problem, as is evidenced by the relative difficulties experienced by universities in recruiting staff to fill IT posts under the DES' 'New Blood' initiative. Furthermore, the increase in the use of distance learning will, initially at least, be resource-intensive in terms of teacher time. Ministers therefore hope that industry will assist by the loan of (or financial support for) highly qualified staff to help in teaching at the forefront of technology.

35 The third major constraint is the availability of **accommodation and equipment**, both of which are in short supply.

36 An important aspect of any proposed expansion in the number of graduates with IT skills is the availability of a sufficient number of high quality young people with relevant A-levels (and BTEC equivalents). There has been a considerable growth in mathematics and science A-levels in recent years, but this pool of young people has attractive alternative outlets in other areas such as medicine and accountancy. Although the position has improved, the supply of good maths and physics teachers is still not entirely adequate. The Government is emphasising the importance of a broad curriculum to 16 which includes maths and science and is generally encouraging relevant studies. A number of other bodies, including the Engineering Council, are making major efforts to promote a positive attitude towards industry in schools. Their efforts are fully supported by the Committee. One particularly important initiative is the Women in Science and Engineering (WISE) year, jointly sponsored by the Council and the Equal Opportunities Commission. Women still only account for about 5 per cent of admissions and applications to electrical and electronic degree courses, a massive waste of potential in this area. Industry too has a vital part to play in encouraging young people to pursue courses in areas of key skill shortage by means of sponsorship and the provision of readily-accessible signals about industry's requirements through the pay and career structures offered to graduates, and through consistent recruitment policies. Industry can play a major role by developing links with schools either directly or through the network of Science and Technology Regional Organisations (SATROS) supported by the Department of Trade and Industry and some Local Education Authorities.

Section 6 — A New Partnership Between Industry and the Education System

37 Representatives of industry have presented an imaginative set of proposals aimed at overcoming some of the constraints noted in the previous Section of this Report and at encouraging a "partnership for change" to enable the education system to respond more effectively to industry's changing requirements.

38 Industry is ready to undertake the following initiatives:

i Higher Education

- Supply key executives as Visiting Professors and help with the supply of lecturers.
- provide consultancy and employment opportunities for academics to enhance dialogue at local level and increase the earnings of key individuals.
- provide equipment on loan or as gifts and give access to very expensive leading edge equipment which universities and polytechnics could not possess.
- commission universities and polytechnics to supply contract education, eg conversion courses, development courses, updating programmes etc.
- make key people available to help coordinate activities to tackle shortages.
- enter into training partnerships with academic bodies.
- establish "IT Training Companies" with equity participation by companies, academic institutions and Government. In this context the Committee welcomed the proposals put forward by DES to enable polytechnics to trade on their own account.
- increase sponsorship of students on relevant undergraduate and post-graduate courses.
- provide greater opportunities for students to obtain industrial experience within academic programmes.
- encourage greater interchange of views between industry and education.

ii Schools

- offer staff to teach part-time and to relate school work to industry.
- help train teachers by visits, secondments, exchanges and courses.

- provide equipment on loan or as gifts.
- Participate actively in programmes designed to promote vocational studies.
- Help schools to appreciate the vocational needs of children and how to respond to them.

Points for Action

39 Preliminary discussions between Government and industry have identified the following areas of agreement:

- i The UGC and NAB will identify their teaching needs so that industry can gauge what assistance can be provided.
- ii Institutions will be invited to identify their needs for equipment.
- iii "Good practice" in giving students relevant industrial experience will be publicised.
- iv A more formal system for regular teacher visits and secondments to industry will be examined.

40 Action along these lines, taken together with the other proposals submitted by industry, creates **a new partnership between industry and higher education** which should enable changing national skill requirements to be met in a more relevant, flexible and cost-effective way. The Government will vigorously pursue all these ideas including novel concepts such as the IT training companies. The Committee's Second report will review progress made in these areas.

APPENDIX I

List of Sources

1. 'Key Skills and the UK Semi-Conductor Industry' — Institute of Manpower Studies (IMS), October 1983
2. 'Manpower in the Electronics Industry' — Engineering Industry Training Board (EITB), May 1984
3. The Computing Services Industry Training Council (COSIT) — submission to House of Lords Select Committee on Science and Technology — sub-Committee 2, New Technologies (not yet published)
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7. 'Special Manpower Needs' — Employment Market Research Unit (EMRU), Department of Employment (not yet published)
8. IMS, op. cit.
9. 'Graduates and Jobs' — Department of Education & Science, and Department of Employment: HMSO, June 1984
10. National Electronics Council (NEC) Survey, 1984 (published May 1984)
11. COSIT, op. cit.
12. National Computing Centre Membership Survey, February 1984
13. PSI, op. cit.
14. 'Policy Statement on Resources for Engineering Education' — the Engineering Council, February 1984

ANNEX I

Information Technology Skill Shortages Committee

John Butcher MP	Parliamentary Under Secretary of State for Industry
Hon Peter Brooke MP	Parliamentary Under Secretary of State for Education and Science
David Baldwin	Managing Director: Hewlett Packard UK
Christopher Ball	Chairman of the Board: National Advisory Body for Local Authority Higher Education
Dr J H Burnett	Principal — Vice Chancellor: University of Edinburgh
Mr G R Hall	Director: Brighton Polytechnic (representing The Engineering Council)
Geoffrey Holroyde	Director: Coventry (Lanchester) Polytechnic
Mr C Marr	Head of Electronics Section: National Economic Development Office
Mr B Oakley	Director: Alvey Programme, Department of Trade and Industry
Dr E S Page	Vice-Chancellor: University of Reading
Professor J Parnaby	Group Director — Manufacturing Technology: Joseph Lucas Limited
Mr T G Rogers	Director — Personnel and Europe: The Plessey Company plc
Mr D Stanton	Employment Market Research Unit, Department of Employment
Sir Peter Swinnerton-Dyer	Chairman: University Grants Committee
Sir Robert Telford	Chairman: The Marconi Company Limited
Mr J Wiltshire	Head of Occupational Policy Branch: Manpower Services Commission

Terms of Reference

ANNEX II

- (i) To establish with more precision what employer demand for IT manpower at professional (graduate) and technician level is likely to be over the next 10-15 year period, with reference to the short, medium and long term;
- (ii) To establish how far the education and training system is likely to meet these needs over these timescales on present financial plans;
- (iii) To determine what steps should be taken by industry and others (a) to meet any shortfall, by additional support for the education system and by increased provision for training and (b) to improve signals from the employment market in matters such as manpower demand and vacancies, pay, career progression or sponsorship of students, recruitment etc.

Definitions

ANNEX III

The term IT and hence the scope of the Committee's activities may be said to cover:

- electronic systems and consumer electronics
- telecommunications and radio frequency engineering
- computing, software and hardware
- computing services
- knowledge based systems
- artificial intelligence
- communications between electronic data processors
- design and production of manufacturing systems, as distinct from their application.

The broad skills needed for IT and related sectors of industry and commerce may be disaggregated as follows:

- computer science, especially software
- electronic engineering
- software engineering
- mathematics
- physics and materials science
- systems engineering
- AMT
- other engineering, especially mechanical, design and production

ANNEX IV

Graduate Requirements by Discipline

- 1 It was agreed at the Committee meeting on 28 June that a quick survey of graduate requirements by discipline in major IT companies would be undertaken by Mr Rogers (Plessey).
- 2 This was done by asking 9 major companies two questions:
 - 1) What is the distribution of your 1984 graduate intake by discipline?
 - 2) What is your view of the intake you expect to require in 1989, and how would you wish this to divide by discipline assuming there are no supply constraints to prevent this?
- 3 The figures supplied are set out in Appendices A and B. The broad conclusions are:

	Question 1 1984		Question 2 1989		% Increase
	No	%	No	%	
Electronic Eng	1365	34	2335	37	71
Physics	439	11	655	11	49
Maths	226	6	375	6	66
Computer Sci	852	21	1415	23	66
Other Sci/Eng	629	16	692	11	10
Other	536	13	759	12	42
Total	4047	100	6231	100	54

- 4 It is apparent, therefore, that the major increases in demand will be for electronic engineers and computer scientists with a similar percentage increase for mathematicians (though the numbers for these are much smaller).
- 5 It should be noted that IBM and ICL have a different pattern of needs to serve the commercial data processing field with proportionately much larger marketing and sales teams to sustain.
- 6 In comments made by the participating companies there were notable reservations about the quality and content of Computer Science and IT courses pointing to the need for closer contact between education and industry.

Table 1: Graduate Requirements of Major Companies in the Electronics Industry 1984

	Mechanical Engineering	Electronic Engineering	Electrical Engineering	Physics	Maths	Computer Science	Other Science/Engineering	Others	Total
Plessey	9	227	16	54	10	141	31	40	528
GEC	126	419	209	222	114	250	42	34	1416
S T C	15	140	15	35	20	87	25	50	387
Ferranti	30	180	5	60	30	155	—	10	470
British Telecom	10	140	25	40	20	60	5	—	300
Racal	12	150	8	10	8	45	20	7	260
IBM	—	60	—	—	—	—	—	240	300
ICL	5	29	—	12	19	85	15	135	300
Hewlett Packard	—	20	2	6	5	29	4	20	86
Total	207	1365	280	439	226	852	142	536	4047

Table 2: Projected Graduate Requirement 1989

	Mechanical Engineering	Electronic Engineering	Electrical Engineering	Physics	Maths	Computer Science	Other Science/Engineering	Others	Total
Plessey	10	370	16	85	30	225	25	40	801
GEC	100	610	220	300	150	350	50	70	1850
S T C	20	300	20	50	40	185	40	45	700
Ferranti	35	360	5	120	70	320	—	10	920
British Telecom	12	210	30	40	25	75	8	—	400
Racal	15	300	12	25	20	80	30	18	500
IBM	—	80	—	—	—	—	—	280	360
ICL	8	40	—	15	20	90	20	207	400
Hewlett Packard	2	65	6	20	20	90	8	89	300
Total	202	2335	309	655	375	1415	181	759	6231

ANNEX V

Projected Home Graduate Output in Science and Technology

1 The tables following show projected home science and engineering graduate output disaggregated between individual disciplines. Tables 1 and 2 show the information for university and CNAAs graduates separately, and Table 3 shows aggregate figures. (The home graduate proportion of total CNAAs graduate output is estimated.)

2 The data, prepared by DES Statistics Branch on the basis of material obtained from the University Statistical Record and the CNAAs, constitute new projections based on known policy decisions affecting intakes to the university and public sectors of higher education.

3 The figures exclude those currently undergoing post-graduate conversion courses through the DES IT in HE initiative: this will lead to an additional qualified output of some 750 computer scientists and 250 electronics engineers by 1985/86.

Table 1: University Home Graduates

G B First Degree Output

(thousands)

	ACTUALS				PROJECTIONS								
	78/79	79/80	80/1	81/2	82/3	83/4	84/5	85/6	86/7	87/8	88/9	89/90	
SCIENCE: Total	14.8	15.1	15.7	16.4	17.3	17.4	17.3	17.1	17.7	17.7	17.3	17.3	
of which													
Agricultural Science			1.3	1.3	1.4	1.3	1.2	1.2	1.3	1.3	1.2	1.2	
Biological Science			4.4	4.5	4.4	4.1	4.2	4.0	4.1	4.1	4.0	4.0	
Mathematics (excluding computer science)			2.2	2.2	2.5	2.6	2.8	2.8	2.9	2.9	2.8	2.8	
Computer Science			1.0	1.2	1.6	1.7	1.5	1.7*	1.7*	1.7*	1.6	1.6	
Physics			2.0	2.2	2.4	2.5	2.6	2.5	2.6	2.6	2.5	2.5	
Other Sciences			4.8	5.0	5.0	5.2	5.0	4.9	5.1	5.1	5.2	5.2	
SOCIAL SCIENCE: Total	15.8	16.3	16.7	17.2	17.6	16.8	16.2	15.7	16.3	16.3	15.8	15.8	
of which													
Hard			9.9	10.2	10.4	9.9	9.6	9.3	9.6	9.6	9.3	9.3	
Soft			6.8	7.0	7.2	6.9	6.6	6.4	6.7	6.7	6.5	6.5	
ENGINEERING: Total	6.8	7.1	7.5	7.9	8.1	8.3	7.9	8.1	8.7	8.6	8.4	8.4	
of which													
Aeronautical			0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Chemical			0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	
Civil			1.3	1.3	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
Electrical & Electronic			1.7	1.9	2.0	2.1	1.9	2.1*	2.2*	2.2*	2.0	2.0	
Mechanical			1.3	1.4	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.5	
Production			0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Mining			0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Metallurgy			0.3	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	
Other general & combined engineering			0.8	0.9	1.0	1.1	1.0	1.1	1.2	1.2	1.1	1.1	
Surveying			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Other technology			0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
Combinations with other subjects			0.4	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.5	
ALL OTHER SUBJECTS: Total	21.4	22.0	22.3	23.0	23.3	23.7	22.8	22.1	23.0	22.5	21.9	21.9	
of which													
Education	1.1	1.2	1.2	1.3	0.9	1.0	0.9	0.9	1.0	1.0	1.0	1.0	
Medicine	5.1	5.2	5.1	5.2	5.2	5.4	5.3	4.9	5.0	4.6	4.4	4.4	
Architecture & other professional subjects	0.9	1.0	1.0	0.9	1.0	1.0	1.9	1.0	1.0	1.0	1.0	1.0	
Arts:	14.4	14.6	14.9	15.6	16.1	16.3	15.8	15.3	15.9	15.8	15.4	15.4	
of which													
Languages	8.1	8.4	8.6	9.0	9.4	9.2	8.8	8.6	8.9	8.9	8.7	8.7	
Music & Drama	1.3	1.3	1.4	1.4	1.4	1.5	1.5	1.4	1.5	1.5	1.4	1.4	
Other Arts	5.0	5.0	5.0	5.2	5.3	5.7	5.5	5.3	5.4	5.4	5.3	5.3	
TOTAL	58.9	60.4	62.2	64.5	66.3	66.2	64.3	62.9	65.7	65.1	63.4	63.4	

*Including graduates from the IT Initiative. Totals may not sum due to rounding.

Table 2: CNA Home Graduates

G B First Degree Output

(thousands)

	ACTUALS				PROJECTIONS								
	78/79	79/80	80/1	81/2	82/3	83/4	84/5	85/6	86/7	87/8	88/9	89/90	
SCIENCE: Total	2.3	2.0	3.6	3.1	4.0	5.4	5.9	6.5	7.1	7.1	7.1	7.2	
of which													
Biological Science			0.8	0.7	0.9	1.2	1.3	1.4	1.5	1.4	1.5	1.5	
Mathematics (excluding computer science)			0.3	0.3	0.4	0.5	0.6	0.6	0.7	0.7	0.7	0.8	
Computer Science			0.6	0.6	0.7	1.0	1.1	1.4*	1.5*	1.5*	1.3	1.3	
Physics			0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	
Other Sciences			1.7	1.4	1.8	2.4	2.6	2.8	3.0	3.1	3.1	3.1	
SOCIAL SCIENCE: Total	6.6	5.1	7.8	6.9	7.7	9.6	9.8	9.8	9.7	9.2	8.8	8.7	
of which													
Hard			5.4	5.3	6.0	7.5	7.6	7.6	7.6	7.1	6.9	6.8	
Soft			2.4	1.6	1.7	2.1	2.2	2.2	2.1	2.1	1.9	1.9	
ENGINEERING: Total	3.2	2.9	4.1	3.7	3.8	3.9	4.7	5.5	5.6	6.2	6.2	6.2	
of which													
Aeronautical			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*	0.0	
Chemical			0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	
Civil			0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.9	0.9	0.9	
Electrical & Electronic			1.2	1.0	1.0	1.0	1.2	1.4	1.5*	1.6*	1.6*	1.6	
Mechanical			0.8	0.8	0.7	0.7	0.9	1.1	1.1	1.2	1.2	1.2	
Production			0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Mining (including metallurgy)			—	—	—	—	0.1	0.1	0.1	0.1	0.1	0.1	
Other general & combined engineering			0.6	0.5	0.5	0.5	0.6	0.7	0.7	0.8	0.8	0.8	
Surveying			0.1	0.1	0.3	0.5	0.5	0.6	0.6	0.7	0.7	0.7	
Other technology			0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	
ALL OTHER SUBJECTS: Total	9.0	10.7	14.7	12.1	13.0	15.1	16.7	16.3	15.9	15.1	14.5	14.2	
of which													
Education	2.9	2.7	4.1	3.3	3.1	3.9	3.8	3.6	3.7	3.5	3.4	3.3	
Medicine	0.5	0.5	0.6	0.6	0.6	0.7	0.8	0.8	0.7	0.7	0.7	0.7	
Architecture & other professional subjects	0.9	1.4	1.9	1.6	1.8	2.1	2.3	2.2	2.3	2.1	2.1	2.0	
Arts:	4.7	6.2	8.1	6.7	7.5	8.4	9.9	9.6	9.1	8.8	8.3	8.3	
of which													
Languages	0.6	0.6	1.1	0.8	1.0	1.0	1.3	1.3	1.3	1.3	1.2	1.2	
Music & Drama	3.8	5.5	4.6	4.4	4.7	5.1	5.9	5.9	5.6	5.4	5.1	5.1	
Other Arts	0.3	0.1	2.4	1.5	1.8	2.3	2.7	2.4	2.2	2.1	2.0	2.0	
TOTAL	21.2	20.7	30.3	25.8	28.5	34.0	37.1	38.1	38.3	37.6	36.6	36.4	

* Including graduates from the IT Initiative.

† Figures for Aeronautical engineering output are very low in the public sector. Actual output for 1980/81 — 0.024.

Table 3: University/CNAA Home Graduates

G B First Degree Graduate Output

(thousands)

	ACTUALS					PROJECTIONS							
	78/79	79/80	80/1	81/2		82/3	83/4	84/5	85/6	86/7	87/8	88/9	89/90
SCIENCE: Total	17.1	17.1	19.3	19.5		21.3	22.8	23.2	23.6	24.8	24.8	24.4	24.5
of which													
Agricultural Science			1.3	1.3		1.4	1.3	1.2	1.2	1.3	1.3	1.2	1.2
Biological Science			5.2	5.2		5.3	5.3	5.5	5.4	5.6	5.5	5.5	5.5
Mathematics (excluding computer science)			2.5	2.5		2.9	3.1	3.4	3.4	3.6	3.6	3.5	3.6
Computer Science			1.6	1.8		2.3	2.7	2.6	3.1*	3.2*	3.2*	2.9	2.9
Physics			2.2	2.4		2.6	2.8	2.9	2.8	3.0	3.0	2.9	2.9
Other Sciences			6.5	6.4		6.8	7.6	7.6	7.7	8.1	8.2	8.3	8.3
SOCIAL SCIENCE: Total	22.4	21.4	24.5	24.1		25.3	26.4	26.0	25.5	26.0	25.5	24.6	24.5
of which													
Hard			15.3	15.5		16.4	17.4	17.2	16.9	17.2	16.7	16.2	16.1
Soft			9.2	8.6		8.9	9.0	8.8	8.6	8.8	8.8	8.4	8.4
ENGINEERING: Total	10.0	10.0	11.6	11.6		11.9	12.2	12.6	13.6	14.3	14.8	14.6	14.6
of which													
Aeronautical**			0.2	0.2		0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Chemical			0.8	0.8		0.8	0.8	0.8	0.9	1.0	1.0	1.0	1.0
Civil			2.0	2.0		1.9	1.8	1.8	1.9	1.9	2.0	2.0	2.0
Electrical & Electronic			2.9	2.9		3.0	3.1	3.1	3.5*	3.7*	3.8*	3.6*	3.6
Mechanical			2.1	2.2		2.1	2.1	2.3	2.5	2.6	2.7	2.7	2.7
Production			0.4	0.4		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Mining & Metallurgy			0.5	0.5		0.4	0.5	0.6	0.5	0.5	0.5	0.5	0.5
Other general & combined engineering			1.4	1.4		1.5	1.6	1.6	1.8	1.9	2.0	1.9	1.9
Surveying			0.2	0.2		0.4	0.6	0.6	0.7	0.7	0.8	0.8	0.8
Other technology			0.5	0.6		0.7	0.7	0.7	0.8	0.8	0.9	0.9	0.9
Combinations with other subjects			0.4	0.5		0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.5
ALL OTHER SUBJECTS: Total	30.4	32.7	37.0	35.1		36.3	38.8	39.5	38.4	38.9	37.6	36.4	36.1
of which													
Education	4.0	3.9	5.3	4.6		4.0	4.9	4.7	4.5	4.7	4.5	4.4	4.3
Medicine	5.6	10.2	5.7	5.8		5.8	6.1	6.1	5.7	5.7	5.3	5.1	5.1
Architecture & other professional subjects	1.8	2.4	2.9	2.5		2.8	3.1	3.2	3.2	3.3	3.1	3.1	3.0
Total arts:	19.1	15.2	23.0	22.3		23.5	24.7	25.7	24.9	25.0	24.6	23.7	18.6
of which													
Languages	8.7	9.0	9.7	9.8		10.4	10.2	10.1	9.9	10.2	10.2	9.9	9.9
Music & Drama	5.1	6.8	6.0	5.8		6.1	6.6	7.4	7.3	7.1	6.9	6.5	6.5
Other Arts	5.3	5.1	7.4	6.7		7.1	8.0	8.3	7.7	7.8	7.5	7.35	7.3
TOTAL	79.9	81.2	92.5	90.3		94.8	100.2	101.4	101.0	104.0	102.7	100.0	99.8

*Including graduates from the IT Initiative. Totals may not sum due to rounding.

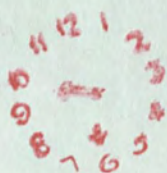
ANNEX VI

Manpower Services Commission TOPS Sponsored High Level Courses 1984/85

Subject	Level	No of courses	No of trainees
Flexible Manufacturing Systems	MSc	4	51
	HND	1	18
Computer Aided Engineering	MSc	1	10
	HND	4	78
Computer Aided Design	MSc	3	35
Robotics	MSc	2	25
	HND	1	20
Telecommunications	MSc	3	45
	HND	2	32
Opto-electronics	MSc	1	10
	HND	2	40
Industrial Data Processing	HND	1	24
Software Engineering	MSc	1	15

Trainees on these courses which last about 46 weeks full-time, receive TOPS allowances.

5 MAR 1985

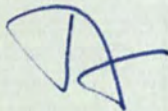


PRIME MINISTER

SWITCH

You queried the proposal to announce the Switch programme on 19 March as part of the Budget. I gather from DES that the Chancellor thought that this would be something positive to improve the public presentation of the Budget. I have conveyed your view to them that it might be better if the announcement were separate in order to avoid being overwhelmed by the rest of the Budget.

Can I take it that you wish to hold a meeting with industrialists at some suitable time in the reasonably near future after the announcement?



Yes.

(TIM FLESHER)

4 March 1985

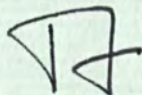
PRIME MINISTER

The Switch

You will recall agreeing to Robin Nicholson's proposal that you should meet a number of industrialists to secure the greatest possible industry backing for the programme. Robin originally envisaged that such a meeting would take place before the announcement of the programme. I gather from DES that they now intend this to be on 19 March and it would clearly be impossible to gather together sufficient of the leading industrialists (I enclose a list of the names envisaged by DES) at only a week or ten days' notice. Their diaries will be just as crowded as yours.

I have accordingly explored with DES whether the announcement might be postponed. Unfortunately it cannot because every day counts if we are to have an impact on the next academic year. An alternative proposal which DES have now put forward would be to make the announcement on 19 March as proposed but to have the meeting subsequently to enlist the support of the industrialists in relation not just to this year but to the second and third year as well.

Andrew and I are agreed on the sheer impossibility of setting up a worthwhile meeting before the announcement. Agree therefore to hold the meeting after the announcement as proposed by DES? Robin Nicholson would be content with this.



Tim Flesher
1 March 1985

That is Budget Day
∴ There would be no publicity
whatsoever for this
announcement no



DEPARTMENT OF EDUCATION AND SCIENCE

ELIZABETH HOUSE, YORK ROAD, LONDON SE1 7PH

TELEPHONE 01-928 9222

FROM THE SECRETARY OF STATE

Mr David Barclay
No 10 Downing Street
SW1

28 February 1985

Dear David,

At the Prime Minister's meeting on 6/February, Ministers agreed to a programme to increase the output of engineering and technology graduates. We understand from your recent conversation with Andrew Sargent in David Hancock's office that the Prime Minister would be prepared to meet an invited group of industrialists in order to secure the greatest possible industrial backing for this programme.

I attach to this letter a list drawn up by DTI of those who might be invited to this function. The list includes all the firms that have publicly indicated willingness to subscribe to the IT Skills Agency (the actual members of which have yet to be announced by the CBI). Also on the list are the current Chairman and the Chairman-elect of the Engineering Council and Sir Robert Clayton who will head the new IT Skills Agency.

It would be best for the meeting to take place just before the announcement of the programme. This is currently planned, subject to the Prime Minister's agreement, for March 19th - either as part of, or in parallel with, the Budget statement. So a date in the preceding week would be ideal.

The Prime Minister's chief objective at the meeting should be to secure commitment to greater assistance to the chosen higher education institutions. The full suggested compass of the meeting is described in the attached draft letter of invitation to industrialists.

In addition to Sir Keith Joseph, you will also wish the Prime Minister to be supported by the Secretaries of State for Trade and Industry and for Employment and the Minister without Portfolio. I am copying this letter to their Private Secretaries and also to Rachel Lomax in the Chancellor of the Exchequer's Office.

*Yours,
Elizabeth*

MISS C E HODKINSON
Private Secretary

DRAFT LETTER FOR THE PRIME MINISTER'S SIGNATURE TO
INDUSTRIALISTS

You will be aware of the concern voiced in many quarters and especially by business about the need to increase the output of graduate engineers and technologists. Attention has been drawn to this, in particular by the Engineering Council and in the first report of the Committee on IT Skills Shortages under the chairmanship of John Butcher at the Department of Trade and Industry.

2. The Government have been considering these representations very carefully. Our first concern was to explore the scope for a redeployment of resources within the higher education system. The cost of science and technology courses is relatively high and we are now satisfied that it would be right to assign some extra resources to this purpose. We envisage a special programme costing about £40 million over the 3 years 1985-86 to 1987-88. Such a programme would only be worthwhile if we could be assured of sufficient industrial co-operation and support of the kind offered by the industrial members of John Butcher's committee.

3. I would like to discuss this with you (and with the others listed on the sheet attached). I particularly wish to enquire whether industry would contribute to such a programme by providing:

- (i) more help with equipment;
- (ii) more help with teaching staff - this is vitally important because it is doubtful whether our HE institutions will be able to recruit qualified staff in sufficient numbers.
- (iii) more placements for students on sandwich courses;
- (iv) active help with the design of relevant courses;

- (v) a readiness to offer worthwhile initial jobs and subsequent careers to the graduates.

4. Ministers will also wish to hear views on the following questions:

- (a) how selective should the forthcoming programme be? Should the extra resources be concentrated on the strongest universities plus the proposed new Institute of Information Technology at Milton Keynes; or should they be more widely spread? In particular, would industry prefer an expansion of capacity in some of our best polytechnics? (The argument is sometimes heard that polytechnics like Hatfield produce a more useful product than many of our Universities.)
- (b) How should co-operation between industry and the chosen HE institutions be organised? Should it be organised centrally, for example, through the IT Skills Agency, Government Departments and the UGC; or would it be better for each participating company to "adopt" one or more participating institutions?
- (c) Would industry be willing to sponsor more students? This we believe is likely to be a very effective way of influencing the career choices of pupils at school and encouraging more young people to study maths, physics and technology.

5. Finally, if there were time, I should like to take the opportunity to seek your views on what more could be done - and I know a lot is being done already - to change the attitudes of parents, teachers and pupils towards careers in business.

6. I hope you will be able to meet me, Keith Joseph and other colleagues at ___o'clock on ___ March at No. 10 Downing St. Would you please let my office know if you can come?



DEPARTMENT OF EDUCATION AND SCIENCE
ELIZABETH HOUSE, YORK ROAD, LONDON SE1 7PH
TELEPHONE 01-928 9222
FROM THE SECRETARY OF STATE

The Rt Hon Norman Tebbit
Secretary of State
for Trade & Industry
LONDON SW1

28 February 1985

See Norman,

attached

Thank you for your letter of 20 February about the approach we might adopt to allocating the resources decided upon at the Prime Minister's meeting on 6 February. John Butcher also wrote to Peter Brooke about this on 22 February.

The main point of substance that both you and John Butcher raise is the possibility that some of the resources for this programme should be allocated to the polytechnics. This is a new suggestion. When I put proposals to E(A) Committee last November, I made it clear that they related only to the universities plus Henry Chilver's new Institution. I therefore assumed that, when John Butcher gave the support of your Department for my proposals in his paper to the Committee, he was satisfied on this point too. In my revised proposals put to the Prime Minister's meeting early this month, I also made it clear that these concerned only the universities and the record of that meeting acknowledges support for that approach and recognition that effective action had already been taken in the polytechnics. In deciding to focus my proposals on the universities in this way, I was acting on the clear advice of the Engineering Council (among others) who argued that the most urgent industrial need was for an increased output of top-quality engineers and technologists from those universities which are best in this field.

I do not dispute that the public sector of higher education, through the National Advisory Body, has shown itself to be extremely responsive to Government calls to reorientate provision - without specific additional resources - to secure greater industrial relevance. And this is particularly true in the area with which this correspondence is concerned. I agree that there will be strenuous protests from that quarter if our programme is directed solely towards universities. For my part I am prepared to stand up to such protests because I do not think it right that the Government should imply that the balance of output from higher education can only be changed if extra funding is provided. You will recall that it was only after careful study of the constraints

securing rapid increases in relevant graduate output from the universities that we concluded that extra resources were essential if we were to secure our objectives in that sector.

Having reconsidered the question in the light of your letter, I do accept that, if there were strong pressure from industry for some of the additional output from this programme to come from the polytechnics, ie. if the Engineering Council's advice were shown to be wrong, then we ought to think again. I would expect industry to prefer only a very few polytechnics to our best universities - I have no wish to see any of these extra resources going to the weaker university departments. The Prime Minister has agreed to arrange a meeting with leading industrialists to discuss the switch and this will provide a good opportunity for Ministers to find out what industry really does want. We have advised No. 10 accordingly.

If it were decided to include a few carefully chosen polytechnics, there would be time to add them in 1986-87. As your officials know, the present plan is to divide the switch programme into at least two stages. To ensure that at least some additional students are admitted to courses this Autumn, we shall need to announce a first phase of projects very soon. I shall be proposing that this be limited to a small number of exceptionally good universities where industrial commitment is either already evident or can be reliably assured. The second and larger phase - of institutions admitting students from 1986-87 - could be organised in such a way as to allow the stronger polytechnics to contend for a portion of the resources available. But I would only want to extend the scheme to polytechnics if industry asked us to do so. I hope you will agree.

You also made some procedural suggestions in your letter. Events have been moving rapidly. Officials of the Departments concerned including the DTI met under the chairmanship of my Permanent Secretary on 11 February to agree the broad outlines of how to proceed with the implementation of Ministers' decisions. By agreement, a working group was set up under the chairmanship of Mr Roy Walker, Under Secretary in this Department. The procedures worked out by that group are intended to meet the particular points in your letter. As regards your suggestion that ITSA be directly involved in the first phase of the programme, I believe that this is met by the invitation that Sir Robert Clayton, the Chairman of the new Agency, has issued to a group of industrialists to help the UGC sift the bids received from universities. I do not think that we can do more because ITSA does not yet actually exist. I would certainly be content for a representative of the Agency to be involved in the second phase of the programme and, if your officials would let Mr Walker know with whom to get in touch, he will so arrange.

I am sending copies of this letter to the Prime Minister, the Chancellor of the Exchequer, the Secretaries of State for Defence, Employment, Scotland and Wales, the Chancellor of the Duchy of Lancaster, the Chief Secretary to the Treasury, the Minister without Portfolio, Sir Robert Armstrong and Sir Robin Nicholson.

G. Lawson
Kevin

1 MAR 1985





CONFIDENTIAL

DEPARTMENT OF EDUCATION AND SCIENCE

ELIZABETH HOUSE, YORK ROAD, LONDON SE1 7PH

TELEPHONE 01-928 9222

FROM THE SECRETARY OF STATE

26 February 1985

See Sand,

WOPM DMS 2/2

"SWITCH TO ENGINEERING AND TECHNOLOGY"

Thank you for your letter of 5 February. I have been most grateful for your support in our discussions over how to improve the output of good-quality engineering and technology graduates. But neither of the suggestions which you make (in the second and third paragraphs of your letter) is without its difficulties.

Saving money in the local authority sector of higher education is at first sight attractive. But you will know of the established reluctance to allow such apparent savings to be spent elsewhere: the Treasury continues to ring-fence local authority expenditure, and there are good grounds for doing this. Besides, savings from a reduction of relatively cheap arts provision in the cheaper local authority sector would produce rather few engineering and technology places in the universities: the ratio is getting on for 1:4.

There is also the substantive question of how much one could soundly set out to reduce expenditure on local authority higher education. The arts and social studies component of the public sector (local authority and voluntary sectors combined) is only some 43,000 full-time and sandwich places in total. I am already planning on the advice of the NAB to reduce this provision by 12% or so to 38,000 in 1985-86. Some of this provision inter-relates with that for initial teacher training, and some will continue to be important to the availability of higher education for students with modest entry qualifications in arts subjects: this applies especially to women. We are sending them a signal through the Switch, but in the interim we have a disproportionate number of

/them not

Lord Young of Graffham
Minister without Portfolio
Cabinet Office
70 Whitehall
LONDON SW1

CONFIDENTIAL

them not qualified to take up technological places. I have, as you know, already secured a significant shift in the public sector towards engineering, science and business studies, and have called for some further movement. But we may be near the limits of what can reasonably be done. Certainly any further strong push would encounter great resistance from those constituted to advise me, ie the National Advisory Body for Public Sector Higher Education.

Again, we can hardly expect to maintain something like the number of arts and social studies places I have quoted but cut the related teaching staff. Within overall student:staff ratios (SSRs) moving to 12:1, the position in these subjects will have to be about 15:1. We are already calling for some 2,000 lecturers to be made redundant, and moreover of course this process has its costs.

I turn to what you say about conversion courses. Some degree courses can be tackled only by students with good A-levels in maths and physics - even other science combinations are not acceptable. These include subjects at the hard end of information technology, such as electronic engineering. More generally, it is true, the pattern of work within many degree courses includes bringing students up to a common level of necessary competence. But, if some are too far on entry from that level, students cannot catch up without extra time, and the teaching costs are very high. It is far more economical in such cases for the "conversion" process to go on in further education colleges. In the longer term, the aim must be to have students coming out of school not needing as much, or any, of this sort of treatment. Much of what I am trying to get achieved in the schools system is relevant to this.

I am copying this letter to the Prime Minister, the Chancellor of the Exchequer, the Secretaries of State for Employment, Trade and Industry, Scotland and Wales, the Chief Secretary, the Chancellor of the Duchy of Lancaster, Sir Robin Nicholson and the Secretary of the Cabinet.

Erwin
Kear

Service Budget



20 FEB 1985

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de RAM

10 DOWNING STREET

From the Private Secretary

25 February, 1985

CONFIDENTIAL

Dear Elizabeth,

MAINTAINING THE STRENGTH OF THE SCIENCE BASE:
SIR ROBIN NICHOLSON'S REPORT

Thank you for your letter of 20 February, reporting progress with Sir Robin Nicholson's proposals on behalf of your Secretary of State and the Secretary of State for Defence.

The Prime Minister is concerned that Departments are not implementing Sir Robin Nicholson's recommendations as vigorously as she thinks is necessary.

Particularly, on the joint design and use of major and specialised facilities, there needs to be more than just an exchange of information, and there is no mention of establishing a more equitable way of meeting the costs of existing facilities or of ways to ensure that they are used cost-effectively. A means must be established to ensure that research activity in fields of common interest is not duplicated and that results are shared wherever possible: there are many areas of work apart from lasers and oceanography where the Ministry of Defence and others must work together more effectively.

The actions to encourage movement of staff, (paragraph (iv) of your minute) do not go very far towards meeting the recommendation that two separate schemes be set up to encourage movement of staff from the Ministry of Defence to the Research Council and University system and vice versa. The Prime Minister does not believe that sufficient exchange of personnel will take place as a result of an increase in collaborative research and asks that more, imaginative, action be taken than is currently proposed.

The Prime Minister welcomes the fact that Research Councils and the Ministry of Defence will work out a new collaborative grant scheme to support defence-related research in universities and Research Council laboratories. However, she expects the response to necessitate expenditure

VR

CONFIDENTIAL

-2-

of more than the proposed £15 million by the Ministry of Defence on university research once the scheme is launched. The Prime Minister also wonders whether publicity for staff exchange schemes could be disseminated when the collaborative grants scheme is announced.

I am sending a copy of this letter to Richard Mottram (Ministry of Defence) and to Richard Hatfield and Sir Robin Nicholson (Cabinet Office).

V. J. [unclear]
David

(D. Barclay)

Miss C E Hodkinson,
Department of Education and Science

RESTRICTED

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EC



10 DOWNING STREET

From the Private Secretary

SIR ROBERT ARMSTRONG

International Science and
Technology Co-ordination

The Prime Minister has noted your minute of 22 February on administrative changes affecting our handling of international science and technology questions.

(Charles Powell)

25 February 1985

RESTRICTED

5

1) Mrs Ryder: to see

2) please p.a.

miss
25/2

Note: I spoke to Daniel Hancock's PS. He will prompt a letter to us from DES Private Office (cleared with DTI) putting forward detailed proposals for such a meeting.

miss
25/2

PRIME MINISTER

THE SWITCH TO SCIENCE AND TECHNOLOGY

The Secretary of State for Energy has come back to us with an offer to provide £500,000 a year for three years to help finance the switch to science and technology. This is as much as Peter Gregson was expecting (indeed more), and brings the total to the figure which Keith Joseph requested.

So the Government has found its contribution. It remains to persuade the private sector to deliver, and both DES and Sir Robin Nicholson are hoping to secure your help in this. You may remember that in briefing for the meeting Robin Nicholson suggested that you should meet a group of leading industrialists in order to bring home to them the importance of their own role in securing the increased output of technically qualified graduates which they say they require.

Would you be prepared to hold such a meeting, which might also usefully invite views on the relevance of the school curriculum to industry's needs?

miss

Yes miss

DAVID BARCLAY

22 February 1985

W.0185

22 February 1985

MR DAVID BARCLAY, NO 10

MAINTAINING THE STRENGTH OF THE SCIENCE BASE:
SIR ROBIN NICHOLSON'S REPORT

Thank you for copying to me the progress report from the Secretaries of State for Defence and Education and Science, towards implementing the recommendations in my report (20 February 1985). *with DB? PM?*

I am concerned that the response of the two Departments seems to be feeble and ineffective. *BOX?*

2. Particularly, on the joint design and use of major and specialised facilities, there needs to be more than just an exchange of lists; in considering areas of research of mutual interest, we must ensure that more than the subject areas already noted are fully explored, and the question of the equitable sharing of the cost of current activities is not mentioned.

3. Interchange of staff is extremely important and paragraph (iv) does not begin to meet the recommendation, set out in my report, that two separate schemes to encourage movement of staff from MoD to the Research Council and University system, and vice versa be set up. Staff movement will not simply arise out of other actions; it needs a lot of work.

4. Even on collaborative research grants the aim of increasing Ministry of Defence expenditure from the current £9m per annum to £15m in 3 years shows little imagination, if these figures include planned expenditure on the new MoD-Research Council scheme.

5. Although I cannot suggest that the Prime Minister should effectively monitor action resulting from my report in the long terms, I am reluctant to recommend that responsibility should pass from her to, say, Sir Robert Armstrong's Official Committee on Science and Technology at this stage when the main messages

of my report, which the Prime Minister has commended, are being addressed so inadequately.

6. I therefore propose that if the Prime Minister agrees with my assessment, a further minute from you would be appropriate and I enclose a draft.

7. I am copying this minute and attachments to Sir Robert Armstrong.

RN

ROBIN NICHOLSON

3

RAMAFN

DRAFT LETTER FOR THE PRIVATE SECRETARY TO THE PRIME MINISTER TO SEND TO THE
PRIVATE SECRETARY TO THE SECRETARY OF STATE FOR EDUCATION AND SCIENCE

MAINTAINING THE STRENGTH OF THE SCIENCE BASE: SIR ROBIN NICHOLSON'S REPORT

your letter of 20 February, reporting progress with Sir Robin Nicholson's proposals
Thank you for ~~the progress report~~ sent on behalf of your Secretary of State and
the Secretary of State for Defence ~~on 20 February.~~

The Prime Minister is concerned that Departments are not implementing Sir Robin Nicholson's recommendations as vigorously as she thinks is necessary.

Particularly, on the joint design and use of major and specialised facilities, there needs to be more than just an exchange of information, and there is no mention of establishing a more equitable way of meeting the costs of existing facilities or of ways to ensure that they are used cost-effectively. A means must be established to ensure that research activity in fields of common interest is not duplicated and that results are shared wherever possible: there are many areas of work apart from lasers and oceanography where MoD and others must work together more effectively.

The actions to encourage movement of staff, (Paragraph (iv) of your Minute) do not go very far towards meeting the recommendation that two separate schemes be set up to encourage movement of staff from the Ministry of Defence to the Research Council and University system and vice versa. The Prime Minister does not believe that sufficient exchange of personnel will take place as a result of an increase in collaborative research and asks that more, imaginative, action be taken than is currently proposed.

The Prime Minister welcomes the fact that Research Councils and the MOD will work out a new collaborative grant scheme to support defence-related research in Universities and Research Council laboratories. However, she expects the response to necessitate expenditure of more than the proposed £15M by MoD on university research once the scheme is launched. The Prime Minister also wonders whether publicity for staff exchange schemes could be disseminated when the collaborative grants scheme is announced.

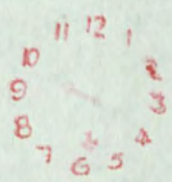
I am sending ^{27 copies} ~~copies~~ of this letter to Richard Mottram
(Ministry of Defence) ^{ad to} Richard Hatfield and Sir Robin
Nicholson (Cabinet Office).

~~c PS/Secretary of State for Defence~~



The first part of the report deals with the
 results of the first series of experiments
 and the second part with the results of the
 second series of experiments. The first
 series of experiments was carried out
 in the laboratory of the University of
 Cambridge and the second series of
 experiments was carried out in the
 laboratory of the University of
 London. The results of the first
 series of experiments are given in
 the first part of the report and the
 results of the second series of
 experiments are given in the second
 part of the report.

22 FEB 1965





Ref. A085/554

PRIME MINISTER

International Science and Technology Co-ordination

This minute reports administrative changes affecting our handling of international science and technology.

2. In 1984, it was agreed that further efforts were needed to develop and integrate Departments' policies towards international science and technology co-operation. This matter is becoming an increasingly important dimension of science and technology policy and of diplomacy and it was clear that, with the spread of Departmental interests, a more co-ordinated approach was needed in order for the UK to gain maximum benefit from its international linkages and help assess the United Kingdom's priorities in this area.

3. It was agreed that the increased level of co-ordination and effort should centre on the Science and Technology Secretariat within the Cabinet Office, which is led by Sir Robin Nicholson. We shall make a modest strengthening of the Secretariat in this area, by transferring a few people from the Department of Trade and Industry and by bringing someone in from the Foreign and Commonwealth Office to fill a previously unfilled position in the Secretariat for this work; there will be no overall increase in manpower. A new sub-committee of the Official Committee on Science and Technology, dealing with international science and technology policy, is being set up: it will be chaired by Sir Robin Nicholson and is expected to meet three or four times a year.

Prime Minister
 CD
 - 22/2

M



4. Departments are keen to see these changes made. They are consistent with the role of the Science and Technology Secretariat and with Sir Robin Nicholson's current responsibilities. The response to the House of Lords Select Committee Report (Cmnd 8591) identified international science and technology as one area to which the Chief Scientific Adviser should turn his attention, and these changes should permit him to discharge that responsibility more effectively.

5. No changes of Ministerial responsibility are involved.

RA

ROBERT ARMSTRONG

22 February 1985



DA
19

10 DOWNING STREET

From the Private Secretary

22 February 1985

THE SWITCH TO SCIENCE AND TECHNOLOGY

Thank you for your letter of 21 February. The Prime Minister is most grateful for your Secretary of State's agreement to provide £500,000 per year for the three years 1985/86 - 1987/88, in order to help finance an increase in the output of science and engineering graduates.

BR

I am sending copies of our exchange of letters to Elizabeth Hodkinson (Department of Education and Science), with the request that DES officials should now contact yours to finalise the details.

I am also sending a copy of this letter, with the previous correspondence, to Mr. Gregson (Cabinet Office).

(David Barclay)

J.S. Neilson, Esq.,
Department of Education and Science.

JA
20

PRIME MINISTER

THE SWITCH TO SCIENCE AND TECHNOLOGY

The Secretary of State for Energy has come back to us with an offer to provide £500,000 a year for three years to help finance the switch to science and technology. This is as much as Peter Gregson was expecting (indeed more), and brings the total to the figure which Keith Joseph requested.

So the Government has found its contribution. It remains to persuade the private sector to deliver, and both DES and Sir Robin Nicholson are hoping to secure your help in this. You may remember that in briefing for the meeting Robin Nicholson suggested that you should meet a group of leading industrialists in order to bring home to them the importance of their own role in securing the increased output of technically qualified graduates which they say they require.

Would you be prepared to hold such a meeting, which might also usefully invite views on the relevance of the school curriculum to industry's needs?

DAVID BARCLAY

22 February 1985



SECRETARY OF STATE FOR ENERGY
THAMES HOUSE SOUTH
MILLBANK LONDON SW1P 4QJ

01 211 6402

David Barclay Esq
Private Secretary to
The Prime Minister
10 Downing Street
LONDON SW1

21 February 1985

Dear David

TD
THE SWITCH FROM ENGINEERING AND TECHNOLOGY IN THE UNIVERSITIES

Thank you for your letter of 7 February, which asked if my Secretary of State would be prepared to offer a contribution from his programme towards the cost of proposals by the Secretary of State for Education and Science for securing an increase in the output of graduates in disciplines relevant to the needs of information technology, especially electronic engineering and computer sciences. You said that the Prime Minister had in mind a figure of £1m per year over the three years 1985-86 to 1987-88, or something approaching that.

Mr Walker has asked me to point out that in order to help the Chief Secretary last autumn, he accepted reductions of £5m in each of the three years in his non-nuclear programmes. He therefore sees great difficulty in making any further reductions in his programmes. He shares the Prime Minister's view of the importance of this sort of pump-priming activity. But he does feel very strongly that research in the energy sphere has enormous potential and the funds that are available to him are very inadequate. He believes that it is damaging to attack these inadequate budgets still further.

Mindful however that Sir Keith Joseph's objectives are important in the development of offshore technology he is willing to provide £500,000 per year for the three years in question in order that the Secretary of State for Education and Science can, in allocating his funds, pay particular attention to those Universities where programmes bearing on offshore technology are being carried out.

Yours ever
John

J S NEILSON
Private Secretary

CONFIDENTIAL



Prime Minister

Robin Nicholson is unhappy about this (see minute at A) and recommends a further letter (flag B).

DEPARTMENT OF EDUCATION AND SCIENCE
ELIZABETH HOUSE, YORK ROAD, LONDON SE1 7PH
TELEPHONE 01-928 9222
FROM THE SECRETARY OF STATE

David Barclay Esq
Private Secretary
10 Downing Street
London SW1

This amounts to nothing

Content for me to send this on your behalf?

20 February 1985

Dub 2/2

Dear David,

MAINTAINING THE STRENGTH OF THE SCIENCE BASE: SIR R NICHOLSON'S REPORT

In your letter of 8 January recording the Prime Minister's commendation of the proposals made in Sir Robin Nicholson's Report on closer relations between MOD, Research Councils and the universities, you recorded the Prime Minister's request for a progress report by 8 February. I am sorry that this is late; we thought it best to clear it with the parties involved. It comes on behalf of the Defence Secretary as well as of my Secretary of State.

At the request of the two Secretaries of State, the recommendations in paragraph 8 of Sir Robin's report were discussed at a meeting chaired by Sir David Phillips and attended by the Chief Scientific Adviser to the Ministry of Defence, Sir John Kingman (SERC), Dr J A Catterall (SERC), Dr J Bowman (NERC) the Controller of MOD Research Establishments, and DES officials. The following actions were agreed:

- (i) a collaborative research grants scheme (para 8a):

MOD already fund research collaboration with universities. They will be steadily increasing the money they put into universities over the next 3 years to reach a level of £15M p.a. This will be taken up partly with MOD/university research programmes (along the lines of existing arrangements), partly by the collaborative research grant scheme via SERC/NERC, and partly by university/industrial collaborative programmes of relevance to defence with the assistance of SERC/NERC. The involvement of the Research Councils primarily SERC and NERC) in tri- or multi-partite collaborations would be a welcome extension, not least in helping to get better value for the total money spent. It should include, where appropriate, Councils' own institutes (provided an equitable costing basis for overheads were agreed by the Treasury). Proposals

only 15m?

CONFIDENTIAL

would need double vetting - by a Council, for scientific merit and interest, and by MOD for relevance. Sir John Kingman would discuss the proposed development with other Heads of Research Councils, and SERC would then resume discussion with MOD to work out a scheme and its announcement (in which MOD might lead, with Councils giving it wide publicity). The aim would be to launch the scheme for 1986/7. Other MOD schemes (MOD-universities, MOD-universities-manufacturing industry) would continue in parallel although the balance between schemes might change.

- (ii) Joint design and use of major and specialised facilities (para 8b)

Sir Robin's examples were agreed to be a promising start. The next step would be for MOD (Mr Fielding) and Dr Catterall (SERC, but co-ordinating contributions from the other Councils) to exchange fuller lists of major and specialised facilities likely to be of common interest.

- (iii) Current areas of research of mutual interest (para 8c)

Exploration here should include exchanging information about intentions for future capital investment in research equipment. It would be desirable to keep European collaboration in mind. A start would be made with detailed assessment, on a UK basis, of needs for research facilities in two areas:

- Lasers: MOD to lead;
- Oceanographic facilities: NERC to lead.

In each case a seminar of interested parties might be a useful start. NERC will also seek, with MOD agreement, separate talks about collaboration with the Met. Office.

- (iv) Staff Secondment (para 8d)

MOD would prepare a note on current and recent staff movement (eg MOD visiting Professors) for discussion with SERC and NERC. Both MOD and the Councils would actively encourage more movement (eg by NERC publicising the possibilities, short and longer term, open to its staff for working in MOD establishments in its Journal). Beyond that, enlargement of opportunities for staff exchanges should build on developments on (i)-(iii) above.

CONFIDENTIAL

The Secretaries of State have endorsed these proposals and have asked officials to keep them informed of progress.

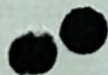
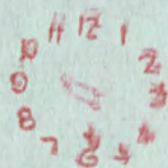
I am copying this letter to Richard Mottram, Richard Hatfield and Sir Robin Nicholson.

Yours,

Elizabeth

MISS C E HODKINSON
Private Secretary

20 FEB 1985



~~CONF~~



DEPARTMENT OF TRADE AND INDUSTRY
1-19 VICTORIA STREET
LONDON SW1H 0ET
TELEPHONE DIRECT LINE 01-215 5422
SWITCHBOARD 01-215 7877

JF7603

Secretary of State for Trade and Industry

20 February 1985

Sir Keith Joseph MP
Secretary of State for Education
and Science
Elizabeth House
York Road
LONDON
SE1 7PH

D Keith,

THE SWITCH TO SCIENCE AND TECHNOLOGY

We need to consider how the funds which we have agreed should be made available for the Switch should be allocated.

2 We have, I suggest, three objectives. The first is to obtain the maximum value for money; by securing the maximum number of new higher education places of the right quality.

3 The second objective is to introduce an effective change in the way the higher education system responds to changing industrial and commercial needs.

4 The third is to secure the active participation of industry. The private sector's contribution is central. We need their advice on which proposals are most likely to produce graduates with relevant skills. Indeed, industry will see this as a pre-condition for their support in cash or in kind to supplement the money being put up by Government.

5 Much of the machinery is already in place. The UGC has asked for, and has received, proposals from the universities for expanding their undergraduate intake in information technology and associated fields, and arrangements have been made for these proposals to be sifted, the obvious non-starters eliminated, and the remainder analysed by discipline and ranked in a rough order of merit. Following the report of John Butcher's Skill



Shortages Committee, industry is in the process of setting up an Information Technology Skills Agency with the twin purposes of analysing demand for IT skills and of co-ordinating industry's contribution to the "partnership for change" which John Butcher's Committee recommended. We have also received innovative proposals from Salford, Cranfield and the Open University which have been worked up with industry. And I believe that we should not shut the Polytechnics out of the Switch, who so clearly have a cost-effective and industrially-relevant track record which should be fostered and continued. We clearly need a machinery for drawing all the threads together, and we need also to move very quickly if proposals are to be approved and funded in time to influence the intake for the 1985/6 academic year.

6 I suggest that the best way forward would be to establish a small group which your Department would chair to consider the proposals as they emerge from the UGC's sift alongside other proposals and decide which should be supported in terms of excellence and industrial relevance. The group would include representatives of the Departments that have contributed to the Switch, plus the UGC (including, I would hope, at least one industrial member) the NAB and the ITSA. The involvement of industrialists at this stage would considerably assist the ITSA in its subsequent task of rallying private sector support for the selected courses and making the new partnership a reality. It would be helpful to the "new partnership" if these points could be borne in mind when defining the machinery to implement the decisions made on 6 February.

7 I am sending copies of this letter to the Prime Minister, the Chancellor of the Exchequer, the Secretaries of State for Defence, Employment, Scotland and Wales, the Chancellor of the Duchy of Lancaster, the Chief Secretary to the Treasury, Sir Robert Armstrong and Sir Robin Nicholson.

A handwritten signature in dark ink, appearing to read 'Norman Tebbit', written over a horizontal line.

NORMAN TEBBIT

21 FEB 1985

U.S. AIR FORCE
BAG



10 DOWNING STREET

From the Private Secretary

7 February, 1985

THE SWITCH TO ENGINEERING AND TECHNOLOGY IN THE UNIVERSITIES

On 28 November 1984 the Ministerial Sub-Committee on Economic Affairs discussed proposals from the Secretary of State for Education and Science for securing an increase in the output of graduates in disciplines relevant to the needs of information technology, especially electronic engineering and computer sciences. Your Department was represented at the meeting by the Parliamentary Under Secretary of State.

The Department of Education and Science proposals would have involved expenditure of £101 million over the three years 1985/86 to 1987/88. The Sub-Committee agreed on the need for urgent action to deal with the shortfall of graduates in these disciplines but did not consider that additional resources should be made available from the contingency reserve.

Since then work has been going on to see how the problem might be solved within existing public expenditure provisions. The Secretary of State for Education and Science has scaled down his proposals to a programme amounting to £42 million over the three years. This would allow the creation of about 600 more first degree graduates from 1989/90 (with up to 200 more in 1987/88 and 400 more in 1988/89) and an additional 500 more post-graduates a year from 1986/87 (with 250 more in 1985/86).

/ He has

h

He has also persuaded the Chairman of the University Grants Committee to secure the UGC's agreement to finding £12 million of the £42 million from their existing provision. This has left some £30 million to be found from other departments. A number of Ministers with economic responsibilities (the Secretaries of State for Trade and Industry, Employment, Scotland and Wales) have already offered to transfer sums from their programmes ranging from £½ million to £5 million a year over the period, despite the fact that this will require them to revise their existing expenditure plans, provided that other Departments are prepared to make similar sacrifices. The total required is within sight.

The Prime Minister has therefore asked me to enquire whether your Secretary of State would be prepared to offer a contribution from his programme: she has in mind a figure of £1 million a year over the three years 1985/86 to 1987/88 or something approaching that. The Prime Minister has asked me to point out that she did not press your Secretary of State the other day when seeking contributions from Departments' research budgets to enable the United Kingdom to participate in the new space programme. She knows, however, that Mr. Walker shares her concern about making the universities more responsive to national economic needs and removing the technological constraints to faster economic growth. The Prime Minister very much hopes, that your Secretary of State will feel able to join with other Ministers in priming the pump in this way.

In order to ensure that the first additional intakes can be admitted this autumn, an announcement of the programme will need to be made soon. The Prime Minister would therefore be

/ grateful

CONFIDENTIAL

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grateful if your Secretary of State could let her have an answer by 14 February.

DAVID BARCLAY

John Neilson, Esq.,
Department of Energy

CONFIDENTIAL



10 DOWNING STREET

Mr Butler

This was Mr Gregson's idea,
and the PM definitely agreed.

But I have some
misgivings - may we
please have a word?

Dub
7/2

JKRAT R



10 DOWNING STREET

(For reference only)

THE PRIME MINISTER

Personal Minute

No.

SECRETARY OF STATE FOR ENERGY

THE SWITCH TO ENGINEERING AND TECHNOLOGY IN THE UNIVERSITIES

On 28 November 1984 the Ministerial Sub-Committee on Economic Affairs discussed proposals from the Secretary of State for Education and Science for securing an increase in the output of graduates in disciplines relevant to the needs of information technology, especially electronic engineering and computer sciences. ^{If the DES proposals would} These would have involved expenditure of £101 million over the three years 1985/86 to 1987/88. The Sub-Committee agreed on the need for urgent action to deal with the shortfall of graduates in these disciplines but did not consider that additional resources should be made available from the ^{contingency} reserve.

Your ^{Department} was represented at the meeting by the Parliamentary Under Secretary of State for Education and Science. ^{The Secretary} Keith Joseph has scaled down his proposals to a programme amounting to £42 million over the three years. This would allow the creation of about 600 more first degree graduates from 1989/90 (with up to 200 more in 1987/88 and 400 more in 1988/89) and an additional 500 more post-graduates a year from 1986/87 (with 250 more in 1985/86). He has also persuaded the Chairman of the University Grants Committee to secure the UGC's agreement to finding £12 million of the £42 million from their existing provision. This has left some £30 million to be found from other departments.

Ministers ~~at large before~~ ^{with economic responsibilities}

A number of ~~colleagues with economic responsibilities~~ (the Secretaries of State for Trade and Industry, Employment, Scotland and Wales) have already offered to transfer sums from their programmes ranging from £½ million to £5 million a year over the period, despite the fact that this will require them to revise their existing expenditure plans, provided that other ~~colleagues~~ ^{Departments} are prepared to make similar sacrifices. We are now within sight of the total required is

The PM has asked me to write to you enquire whether your SotS
I am therefore ~~now writing to ask whether you would offer a~~ ^{would be prepared to offer a} contribution from your programme: ~~say~~ ^{from his} of £1 million a year over the three years 1985/86 to 1987/88 or something approaching that. ~~I did not press you the other day when we were asking~~ ^{the PM has asked me to find that she did not press your Secretary of State} colleagues for contributions from their ~~research budgets~~ ^{Departments} to enable the United Kingdom to participate in the new space programme. ~~She~~ ^{Mr Walker} knows however, that ~~you~~ ^{her} shares my ~~concern~~ ^{to about} about making the universities more responsive to national economic needs and removing the technological constraints to faster economic growth. ~~I~~ ^{The PM} very much hopes, therefore, that you ~~will~~ ^{SotS} feel able to join with other ~~colleagues~~ ^{Ministers} in priming the pump in this way.

In order to ensure that the first additional intakes can be admitted this autumn, an announcement of the programme will need to be made soon. ~~I should~~ ^{The Prime Minister would} therefore be grateful to know if ~~whether you are able to help within a week from now.~~ ^{your} Secretary of State could let her have an answer by 14th February.



CONFIDENTIAL

GC/CF

I have signed
the top copy

JWRATR

Prime Minister

Dmb
8/2

P.01487

MR BARCLAY

Draft attached for private
secretary signature.
Content?

L. 71 collect

Dmb
7/2

THE SWITCH TO ENGINEERING AND TECHNOLOGY IN THE UNIVERSITIES

As promised at last night's meeting I attach the draft of a letter for the Prime Minister to send to the Secretary of State for Energy.

2. I have deliberately not referred to the meeting and have refrained from copying the letter to other Ministers since it would be counter-productive to give the impression of ganging up against the Secretary of State for Energy. I have also left the arithmetic about the existing contributions and the shortfall deliberately obscure so as to minimise the scope for debating points about other people's offers.

3. Since Mr Walker's general line is that far too much weight is placed on keeping within the precise public expenditure totals, he will probably reply that any shortfall should be found by the Treasury, notwithstanding the view E(A) took about this (in his absence) on 28 November. Nevertheless we owe it to the other contributing Ministers to make the attempt.

PLG

P L GREGSON

7 February 1985

CONFIDENTIAL

DRAFT LETTER FROM THE PRIME MINISTER TO THE SECRETARY OF STATE
FOR ENERGY

THE SWITCH TO ENGINEERING AND TECHNOLOGY IN THE UNIVERSITIES

On 28 November 1984 the Ministerial Sub-Committee on Economic Affairs discussed proposals from the Secretary of State for Education and Science for securing an increase in the output of graduates in disciplines relevant to the needs of information technology, especially electronic engineering and computer sciences. These would have involved expenditure of £101 million over the three years 1985/86 to 1987/88. The Sub-Committee agreed on the need for urgent action to deal with the shortfall of graduates in these disciplines but did not consider that additional resources should be made available from the reserve.

Since then work has been going on to see how the problem might be solved within existing public expenditure provisions. Keith Joseph has scaled down his proposals to a programme amounting to £42 million over the 3 years. This would allow the creation of about 600 more first degree graduates from 1989-90 (with up to 200 more in 1987-88 and 400 more in 1988-89) and an additional 500 more post-graduates a year from 1986-87 (with 250 more in 1985-86). He has also persuaded the Chairman of the University Grants Committee to secure the UGC's agreement to finding £12 million of the £42 million from their existing provision. This has left some £30 million to be found from other departments.

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A number of colleagues with economic responsibilities (the Secretaries of State for Trade and Industry, Employment, Scotland and Wales) have already offered to transfer sums from their programmes ranging from £½ million to £5 million a year over the period, despite the fact that this will require them to revise their existing expenditure plans, provided that other colleagues are prepared to make similar sacrifices. We are now within sight of the total required.

I am therefore now writing to ask whether you would offer a contribution from your programme - say of £1 million a year over the three years 1985/86 to 1987/88 or something approaching that. I did not press you the other day when we were asking colleagues for contributions from their research budgets to enable the United Kingdom to participate in the new space programme. I know however that you share my concern about making the universities more responsive to national economic needs and removing the technological constraints to faster economic growth. I very much hope therefore that you will feel able to join with other colleagues in priming the pump in this way.

In order to ensure that the first additional intakes can be admitted this autumn, an announcement of the programme will need to be made soon. I should therefore be grateful to know whether you are able to help within a week from now.

Sci + Tech
Budget



10 DOWNING STREET

DG2 ACU
SUBJECT
c. Master Set
cc Lord Young

From the Private Secretary

6 February 1985

THE SWITCH TO ENGINEERING AND TECHNOLOGY

The Prime Minister chaired a meeting today to consider your Secretary of State's proposals, set out in his minute of 1 February, for securing an increase in the output of engineering and technology graduates. Lord Young's letter to your Secretary of State of 5 February was also before the meeting. Those present, in addition to Sir Keith, were: the Chancellor of the Exchequer, the Secretaries of State for Trade and Industry, Employment, Scotland and Wales, the Chancellor of the Duchy of Lancaster, the Chief Secretary to the Treasury, Sir Robin Nicholson and Mr. Gregson.

Your Secretary of State said that his colleagues in economic Departments were clear that the requirement for engineering and technology skills exceeded supply. They considered it vital to remedy the position in the interests of sustaining and improving our economic performance. Decisions were needed soon if additional places for engineering and technology graduates were to be made available in the universities from September 1985. His proposals envisaged expenditure of £42 million over the next three years (£10 million in the first year and £16 million in each of years two and three). He was prepared to contribute £4 million a year towards this expenditure. Thereafter he hoped that resources released by redeployment within the educational system could make a contribution.

In discussion there was clear agreement that measures to increase the supply of engineering and technology graduates were both vital and urgent. Action had already been taken in the polytechnics, and your Secretary of State's proposals for the universities were supported.

The Secretary of State for Trade and Industry said that he attached such importance to achieving a switch to high technology training that he would be prepared to contribute towards the cost at the expense of his other programmes. His contribution would be made on the understanding that other Departments with an interest would pay a share, and that all contributing Departments would have a say in deciding between the bids received from universities to run

Sw

courses. The Secretary of State for Employment, the Secretary of State for Scotland and the Secretary of State for Wales also indicated their willingness in principle to contribute towards the cost.

In discussion of detailed figures, the Secretary of State for Trade and Industry said that, on the conditions to which he had referred, he would be prepared to provide £2½ million in the first year, and £5 million in each of the following two years. The Secretary of State for Employment said that he would match this, provided that he could reach agreement with the Chief Secretary about any necessary adjustment between programmes. The Secretary of State for Wales said that he would endeavour to find £½ million a year; and the Secretary of State for Scotland said that he could offer a contribution of the order of £1 million a year, provided that he could be satisfied that other Departments not represented at the meeting were appropriately involved.

Summing up the discussion, the Prime Minister said that your Secretary of State's proposals were agreed in principle. She was grateful to those Ministers who had offered to contribute towards the cost, and she invited the Secretary of State for Education and Science, in consultation with the Chief Secretary, Treasury, to finalise the details with the contributing Ministers. She would herself write to the Secretary of State for Energy seeking some contribution to the cost of the switch, in view of the benefits which would accrue to the energy industries and to energy research.

I am sending copies of this letter to those who attended the meeting, and to Richard Hatfield (Cabinet Office).

David Barclay

Miss Elizabeth Hodkinson,
Department of Education and Science.

CONFIDENTIAL



CABINET OFFICE

70 Whitehall London SW1A 2AS Telephone 01-233 3299

From the Minister without Portfolio
The Rt Hon Lord Young of Graffham

The Rt. Hon. Sir Keith Joseph MP
Secretary of State,
Department of Education & Science,
Elizabeth House,
York Road,
London, S.E.1.

5th February, 1985

THE SWITCH TO ENGINEERING AND TECHNOLOGY

As I will not be able to attend the meeting on 6th February to discuss your proposals, I am writing to let you have my views.

I appreciate the problems which you face in reducing degree provision for non-scientific subjects in order to free resources for subjects of higher priority. Nevertheless, I think we are all agreed on the urgent need for more engineering and technology places. I wonder whether means cannot be found to overcome the difficulties in redeploying resources freed from reductions in arts provision outside the universities if you are convinced that it would be wrong to reduce the number of arts places in the universities. Unless we take some steps to signal our belief that the balance of places overall is out of line with current needs, I assume students will continue to take at school subjects which perpetuate the present unsatisfactory position.

Can we not also consider conversion courses which will enable arts A level students to take engineering and technical degrees? These could be containable within the first year of a degree.

I also wonder whether the option of seeking university staff reductions in arts subjects which you propose as an alternative is worth pursuing given the costs and the likely effect on the quality of courses unless it is accompanied by a shift in the balance of provision.

..../Cont.

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- 2 -

I am copying this to the Prime Minister, the Chancellor of the Exchequer, the Secretaries of State for Employment, Trade & Industry, Scotland and Wales, the Chief Secretary, the Chancellor of the Duchy of Lancaster, Sir Robin Nicholson and the Secretary of the Cabinet.

James
Hawthorn

CONFIDENTIAL

6 FEB 1985

11 12 1
9 2 3
8 4 5
7 6



W.0103

5 February 1985

PRIME MINISTER

THE SWITCH TO ENGINEERING AND TECHNOLOGY

I support the proposal by the Secretary of State for Education and Science to increase the number of first degree graduates and postgraduates in engineering and technology.

2. There is widespread, although sometimes poorly-documented, evidence that the shortage of skilled manpower is a significant problem in many parts of industry. This is especially true with respect to Information Technology skills which are needed not only by electronics and computer companies but, increasingly, by industry as a whole in the drive to modernise production and to resist foreign competition.

3. Last week, the House of Lords Select Committee on Science and Technology published their report on Education and Training for New Technologies and identified skills shortages, again particularly in the software, systems and electronic engineering fields of IT, as a major obstacle to improvement in our international competitiveness. They recommended an increase in the number of places for engineering and technology students, in fact well above the level now proposed by the Secretary of State.

4. The IT Skills Shortages Committee under Mr Butcher have proposed short-term measures to help meet the demand, through re-training of existing personnel and conversion courses for both technical and non-technical graduates. But the Committee believe that an increased supply of graduates and postgraduates in the appropriate skills will be essential before the end of the decade.

5. The Secretary of State's proposal to create 600 new first degree places by the end of the decade, together with an additional 500 postgraduate places a little earlier, does not go as far as most estimates indicate will be necessary - the Director of the Alvey Programme has estimated a shortfall of 5000 graduates in the same time-scale and the MSC even more!

6. If the Secretary of State's proposals are accepted, it is essential that the private sector make a full contribution in cash and in kind through, for example:

(a) allowing their staff to act as part-time lecturers in universities;

(b) offering IT equipment to universities on generous terms;

(c) paying consultancy fees to university staff with IT skills so as to raise their total remuneration to a more competitive level compared with opportunities in the private sector and in universities abroad.

7. The private sector component of this initiative is so important that I recommend that before any Government decision is announced, you should see the Chairmen of the dozen or so companies principally involved and ensure their commitment to this part of the initiative.

8. I am copying this minute to Sir Robert Armstrong.

RBN

ROBIN NICHOLSON
Chief Scientific Adviser

Cabinet Office
5 February 1985



CONFIDENTIAL

P.01485

PRIME MINISTER

The Switch to Engineering and Technology

BACKGROUND

The Secretary of State for Education and Science's proposal that additional money should be made available to fund an increase in the output of graduates in Information Technology (IT) disciplines was discussed by E(A)(84)28th Meeting last November. The cost of his proposals would have been £101 million over the three years to 1987/88. The Sub-Committee concluded that existing provision appeared adequate to deal with the need which had been identified; and that additional resources should not be made available from the reserve. You agreed, however, to consider further with him and other Ministers concerned how best to ensure that universities spent their funds in ways which matched national economic requirements.

FLAG A

2. Sir Keith now proposes in his minute of 1 February a smaller scheme costing £42 million in the next three years. He proposes that £12 million should come from funds earmarked within University Grants Committee (UGC) funds for an abortive scheme (the "Seedcorn" scheme) for promoting research links between universities and industry. In his letter of 23 January to Sir Keith, the Secretary of State for Employment offered a contribution of £1 million in 1985/86. Sir Keith proposes that this contribution should be increased to £12 million over the three years, that the Secretary of State for Trade and Industry should contribute a similar amount and that smaller contributions of £4.5 million and £1.5 million should come from the Secretaries of State for Scotland and Wales.



3. Your Private Secretary's letter of 10 January to Sir Keith's Private Secretary asked him for a paper on ways of accelerating the switch in the balance of university courses to release resources for an increase in output of relevant graduates. His minute of 1 February proposes a reduction of 500 arts staff posts over five years for this purpose, with the total restructuring cost of £17 million to be met by the Treasury.

MAIN ISSUES

4. Main issues are:

- i. how should a "switch" scheme of the type proposed by Sir Keith be financed; and
- ii. what further action should be taken to change the balance of university courses in favour of relevant disciplines.

UGC and DES Programmes

5. Sir Keith himself dropped his bid for the switch in his bilaterals with the Chief Secretary, Treasury last year. If the expenditure involved is as important as his proposals now imply, the Ministers he suggests should contribute will no doubt expect him to find a substantial sum from within his own programmes. The meeting will need to consider whether the £12 million he proposes is enough. It is well under one-third of the total; and seems to have been found entirely from provision which, it is implied in his minute to you of 21 December, is painlessly available following the reluctance of the UGC to proceed with "Seedcorn". You will want to probe Sir Keith's judgement in his latest minute (paragraph 8) that the UGC can do no more.



6. In considering special arrangements involving contributions from non-education sources, the meeting will need to consider very carefully the signal which the UGC might read into them about their financial position and responsibilities more generally. The sums involved in Sir Keith's scheme are very small as a proportion of the provision of about £1.4 billion for universities' current expenditure. The Sub-Committee on Economic Affairs took the view in November that the existing provision was adequate for the need identified. The Chief Secretary's letter to Sir Keith dated 18 January pointed out the dangers of showing readiness to give extra money to foster relatively minor changes of emphasis in the universities, particularly when there may be a need before long for much more radical - and painful - adjustments.

which is
12% up in real
terms on 1978/79

Other Government Departments

7. You will want to establish whether Mr King and Mr Tebbit are willing to contribute on the scale suggested by Sir Keith. It would perhaps be surprising if they were. You may have your own views on whether Mr King and Mr Tebbit should contribute, and, if so, how much. More generally, given the view of E(A) about the adequacy of existing education provision, the burden of proof seems to lie with Sir Keith. Both Sir Keith and Mr King appear to envisage contributions also from the Secretaries of State for Scotland and Wales. It is not clear why they should be thought more suitable donors than, say, the Secretaries of State for Defence and Energy, who will not be present but whose interest in the new technologies is arguably as great, and certainly more specific.

The Private Sector

8. It is doubtful whether it could be realistic to look to the private sector for cash contributions to a scheme of the kind Sir Keith has in mind, but a number of ways in



which the private sector could help with the provision of relevant courses were suggested in November at E(A)(84)28th Meeting and may be worth pursuing further. They included loans of staff and equipment, bank loans for students, "pump-priming" finance within existing expenditure provision and tax incentives. You might enquire how much further these ideas have been taken. If further work needs commissioning, it would be appropriate to give the remits to Mr Tebbit, closely consulting Sir Keith and bringing in Treasury and other Ministers as necessary.

Changing the Balance of University Courses

9. Sir Keith is preparing a Green Paper on higher education, which has been delayed by his review of student support. The aim is to build on the approach of offering more systematic guidance to the UGC as part of a more direct Government role in determining higher education policy. The most productive way to proceed might be for E(A) to consider means of changing the emphasis of courses in that context when the draft Green Paper is available, though that need not rule out decisions now on any desirable changes. The following points arise on Sir Keith's proposals for staff reductions in arts subjects.

- i. The remit given to Sir Keith was to release resources to allow a change of emphasis, but he says that even the comparatively modest changes proposed can be achieved only at an additional cost of £17 million. Is there no scope at all for changing emphases within existing resources, even over so long a period as five years?
- ii. Sir Keith's proposals are determined in part by his argument that it is right to reduce the total numbers of arts students places in higher education, but that all the reductions should take



place outside universities, where standards are lower; and none of them within, where standards are higher. Is this argument valid? It gives no weight to the value of arts students as a stock of talent which might be capable of diversion into high-standard university courses in more relevant disciplines (accountancy, law, business studies etc, if not technical subjects) if fewer university arts places were provided.

HANDLING

10. You should ask Sir Keith to introduce his paper. All Ministers attending will wish to comment.

CONCLUSIONS

11. You will wish to reach conclusions on the following.
- i. On the switch, how a scheme of the type proposed by Sir Keith should be financed.
 - ii. On changing the emphasis of university courses,
 - a. whether arts teaching staff should be reduced to the extent and over the period proposed by Sir Keith; and
 - b. any further work to be done in the context of the Green Paper on higher education.

PLG

P L GREGSON

5 February 1985

PRIME MINISTER5 February 1985THE SWITCH TO ENGINEERING AND TECHNOLOGY

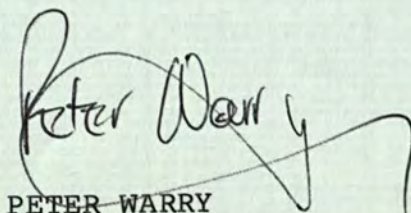
Keith Joseph wants to spend a total of £42 million over three years to produce 600 more graduates and 500 more post-graduates each year in engineering and technology. The argument is that Britain is producing too few graduates trained in the 'skills of tomorrow'. But what is the concrete evidence to support this view?

plus £17 million over
5 years to cut back
arts done.

We think that you should be cautious about the proposal:

- i. £42 million is a lot of money.
- ii. The switch will be very unpopular in the universities, and will cause articulate outrage.
- iii. Queues for arts places at university are stronger than those for science places.
- iv. To produce more good technology graduates, demand must first be stimulated by improved teaching at schools and encouraging children in its study.
- v. The bulk of new jobs are created in the service sector rather than in electronics.
- vi. The market does not appear to favour engineers. Their salary rates may be rising, but are still lower than for accountants.

We recommend that if money is to be spent it should go first to the schools whilst better concrete evidence is accumulated for making any major switch in universities.



PETER WARRY

OLIVER LETWIN

CONFIDENTIAL

pp. a

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PRIME MINISTER

There are two subjects for your meeting with Sir Keith Joseph.

- (i) Can a discussion of the Switch take place without tackling the long term problem of the balance of courses in Universities?

- (ii) Sir Keith has seen a possible "benefactor" who might finance a counter campaign in the rate-capping and abolition battles. The benefactor will have been shown Kenneth Baker's paper setting out the problem. If Sir Keith secures a promise of money, he, Mr. Gummer and Mr. Baker can set about designing a campaign.

I gather you thought the Baker paper was so good that a means should be found of publishing it (without revealing its origins). Agree I put this to Mr. Baker?

- No - I think we should need to see the evidence for the assertions
Just not

4 February 1985

CONFIDENTIAL

CGNO

PRIME MINISTER

THE SWITCH TO ENGINEERING AND TECHNOLOGY IN THE UNIVERSITIES

1. We are to meet on 6th February to discuss my proposals to secure an increase in the output of engineering and technology graduates which E(A) discussed on 28 November 1984 (E(A)(84)(63)). I minuted you further on the matter on 21 December, and your private secretary replied on 10 January. Tom King subsequently wrote to me on 23 January about resources for the initiative.

2. When we had a word about this issue on 3 January you asked about the possibility of further reducing provision for non-scientific subjects in universities in order to free resources for higher priority areas. I explained that any such reduction would involve closing departments and would require money for redundancy compensation, but we agreed that I should nevertheless explore the possibilities.

3. In the longer term it may be desirable to reduce the total number of "arts"* places in higher education. The logical place to do this would be in those parts of the public sector where quality is lower, and not in the universities. However, the total number of arts places (we can consider separating their distribution between subjects) should not be run down faster than we are able successfully to encourage young people to take at school

* see foot of back page.

subjects that will enable them to follow courses in engineering, science and the numerate disciplines in higher education (although the process of "switch" will itself be an important part of that encouragement). In the short term:

(a) we should not be seeking to reduce the total number of arts places in the universities because our long term aim is to reduce arts provision elsewhere; and

(b) it would not be easy to use resources released by cuts in arts provision outside the universities to finance the "switch" within them, because of the different arrangements for planning local authority and university expenditure.

The immediate aim of accelerated rationalisation in the universities should therefore be to cut staff numbers in the arts to release resources without reducing the number of student places. This means tighter student:staff ratios which, if teaching is to remain viable, must in turn involve a move to larger departments than are the norm at present. Some departments will have to close and the subject range at some universities will have to be reduced; this will provide an opportunity for pruning weaker and less rigorous departments. This would be a significant exercise. It will need careful planning and will take time to get right.

But have you got a plan to do it without a lot of talk about it? not

*It must
be done and
on a ~~right~~
significant
scale*

*How many don
under 5 years
remain?*

4. Some acceleration in a move away from arts provision could nevertheless be helpful and I have asked officials to examine what might reasonably be done in this direction. There was a net decrease of an estimate of 1 in 7 in the number of academic staff in these subjects between 1981-82 and 1984-85. Over the next few years only a small number of posts which will neither be abolished on present plans nor have to be filled for proper management reasons will fall vacant by natural wastage. Tenure means that attempts at rapid reduction by dismissal would either fail (universities would hold that they were not empowered to break contracts) or lead to high compensation claims through the courts (in some cases, I understand, the courts might award as much as £250,000 to a young arts don with little prospect of a job elsewhere). The shorter the period in which reductions have to be achieved, the less usable natural wastage will be available, the more staff would have to be compensated and at higher costs, and the greater would be the disruption and inefficiencies created.

5. We cannot afford - and would not in any case want - to find large sums for a redundancy compensation scheme. But I believe that it would be appropriate for us to propose something more modest. I suggest that we should ask the UGC to seek a reduction of about 500 posts over 5 years, half from natural wastage and half from voluntary redundancies and early retirements. On this timescale costs for compensation (and consequent additional payments to the Universities' Superannuation Scheme) might be held at something

£17m

like 1981-84 levels, implying expenditure of about £2m a year over 5 years, plus an additional £7m in total for higher contributions to the USS over a longer period (which might be capitalised). I would expect the Treasury to be prepared to meet these costs, on the precedent of the earlier cuts, as their contribution to the overall restructuring of provision.

6. I have also considered the obvious alternative form of rationalisation, withdrawal of funding from one or more universities leading probably to their closure. Apart from the savings this might generate in the longer term it could help more generally by concentrating resources on the best institutions.

Demography may eventually bring about some closures, although not necessarily in the university sector. However the opposition to withdrawal of funding would be very great and the timescale of the operation lengthy: substantial savings would be unlikely to accrue until at least 5 years after the Government had taken final decisions.

7. I judge that neither rationalisation within the scope of what is feasible nor the closure of institutions can help us to meet the urgent pressure for more engineering and technology places in the universities in the short term. For this purpose I believe we need to announce an initiative of credible size. I judge this to be a commitment for at least

3 years and to total expenditure of between £40-45m over that period. £42m would allow the creation of about 600 more first degree graduates from 1989-90 (with up to 200 more in 1987-88 and 400 more in 1988-89), and an additional 500 more postgraduates a year from 1986-87 (with 250 more in 1985-86). These figures might be improved upon if some institutions can offer high quality places at less than average costs. I would wish to consider in consultation with colleagues and taking advice eg from the research councils how the money should be distributed to match shortage areas and to secure best value for money. If a firm announcement can be made within a few days of your meeting the first additional intakes can be admitted this Autumn. Further delay will mean that nothing can be achieved before the 1986-87 academic year.

8. I have asked the Chairman of the UGC what he could do to help if Ministers decided that this proposal should have priority over other things, such as the "seedcorn" fund (see paragraphs 4 and 5 of my minute of 21 December). He has undertaken to secure the agreement of his Committee to the provision of £12m over 3 years. He has convinced me that he cannot do more. (The reasons are fully set out in my minute of 21 December). I propose that other Departments should contribute as follows:

DTI	£12m
DEm/MSc	£12m
Scottish Office	£4.5m
Welsh Office	£1.5m

giving with the DES/UGC £12m a total of £42m over 3 years. Officials will need to discuss the optimum disposition of these funds between academic years.

9. I am copying this minute to the Chancellor of the Exchequer, the Secretary of State for Trade and Industry, the Secretary of State for Scotland, the Secretary of State for Wales, the Minister without Portfolio, Sir Robin Nicholson and the Secretary of the Cabinet.

KJ.

1 February 1985

THE DEPARTMENT OF EDUCATION AND SCIENCE

*"Arts" subjects are here confined to humanities, languages, government and public administration and soft social sciences - ie excluding accountancy, law, management studies, economics, geography and (already subject to tight numerical control) education.

PRIME MINISTER

PERSONAL

THE SWITCH TO ENGINEERING AND TECHNOLOGY

You are holding a meeting on 6 February to discuss this matter. You have asked me a number of very pertinant questions about the structure and management of our universities. I am incorporating my answers in a minute which I am circulating to those attending the meeting.

2. I certainly agree with you that we ought to consider fundamental changes of policy for the longer term. One possibility is student loans, to give students the incentive to choose subjects for which there is market demand. Another is a redundancy scheme for arts and social studies dons. Another is to cease funding one or more universities.

3. None of these policies could be implemented immediately. We are committed to a review of student support. Redundancy schemes large enough to make an impact on the problem would cost more than the Treasury would wish to pay. The choice of any university to cease to fund would provoke controversy. In all three cases, the potential savings would only be secured after a delay.

4. In the meantime we have an urgent problem. Public expectations have been aroused that the Government means business over the shortage of top quality graduates in (particularly) electrical and electronic engineering. Left to itself, the employment market cannot be expected to resolve current shortages within the necessary timescale - even though leading employers tell us that salaries are escalating.

cc M. G. ...
cc NO
cc M. G. ... CO.

5. We must now decide whether or not to announce a scheme to increase the intake to the best university courses in this field. Unless we announce such a decision by the end of February, it will be too late to increase the intakes of students in October 1985.

6. As I see it we have only two options. Either we agree to state publicly that the Government has decided that it cannot afford to take an initiative; or the economic and regional Departments agree to contribute to the cost of the credible scheme, as I am prepared to do by sacrificing another project. Assistance from industry would be made a condition of our spending - see below.

7. Announcing a decision to do nothing could make the Government look ridiculous after all the discussions that there have been. It would also deny the country top-quality engineers that my relevant colleagues assert are needed. If you agree, the purpose of Wednesday's meeting must be to persuade the economic and regional Departments to provide finance to match the DES contribution. I suggest the following package - the sums shown below are total contributions spread over the three years 1985/86 to 1987/88 inclusive:

	£m
DES/UGC	12
DTI	12
DEm/MSc	12
Scottish Office	4.5
Welsh Office	1.5
	<hr/>
	42
	<hr/>

This total might be spread over the three years as follows: £10 million in 1985/86 and £16 million in each of the next two years.

8. The money would be distributed in response to bids demonstrating clear support by industry (eg through the provision of equipment or specialist staff as teachers). The CBI 's new IT Skills Agency should also be expected in due course to play a critical role.

9. If you would like to discuss this matter with me before your meeting on 6 February, I am of course at your disposal.

KJ

K J
1 February 1985

Department of Education and Science



10 DOWNING STREET

Prime Minister ①

Sir Keith has circulated his proposals for achieving the switch - Flag B. But he has sent you a personal note - Flag A, to urge that the meeting concentrates on the immediate question of getting the switch going. He fears that long term reform of higher education will take time to formulate. If this has to be settled first, the opportunity to start the switch next year will be lost.

Are you content to proceed on this basis? I will see H. J. from mt.

AT:1/2

I just don't think the department has really turned their minds to trying to achieve whatever wants. It has not approached the matter as a 'fait accompli' downed.

Blf for meeting.

JMS
30/1

1) Mr Turnbull
2) Prime Minister

Relevant to your meeting
next week on "the switch".

29 January 1985

JMS
29/1

W.096

PRIME MINISTER

EDUCATION AND TRAINING FOR NEW TECHNOLOGIES

The House of Lords Select Committee on Science and Technology are to publish tomorrow a report examining the ability of the UK educational system to support new technologies important to the economic future of the nation. The Annex contains a summary of some of the conclusions and recommendations of the report.

2. The report, which is the work of the Sub-Committee on New Technologies, points out that shortages of skilled manpower exist, or are being forecast, in some of the new, knowledge-intensive areas of industry - particularly those involving the use of Information Technology. The Committee has tried to look beyond the immediate problems, such as those already addressed by Mr Butcher's IT Skills Shortages Committee, and to identify ways of making the educational system more flexible in order to meet the needs of new technologies in general.

3. The Committee has taken evidence from a wide selection of those inside and outside Government who are concerned about the impact which shortages of skilled people will have on UK industrial competitiveness. This problem will affect not only the new industries but also existing ones where the new technologies are necessary to improve, or even maintain, their trading position. I consider that this report is a timely contribution to the debate on the issue and that its conclusions and recommendations should be closely studied by the Government.

4. The Secretary of State for Education and Science is proposing that his Department should take the lead in preparing a response. I support his suggestion. Much of the report will

be welcome to Government and, indeed, familiar to Ministers from the discussions of the 'switch' to new technologies and engineering. However, the public expenditure implications will need to be carefully analysed and the scope for private sector funding thoroughly studied.

5. I am copying this minute to Sir Robert Armstrong.

RAN

ROBIN NICHOLSON
Chief Scientific Adviser

Cabinet Office
29 January 1985

EDUCATION AND TRAINING FOR NEW TECHNOLOGIES

SUMMARY OF MAIN POINTS OF THE REPORT

1. New technologies are characterised in the report as being fast-changing and demanding of a multi-disciplinary approach from those involved in technical, managerial and educational roles. Therefore individuals must have a broadly-based education in the principles underlying the new technologies and accept the need for retraining as technological change makes existing skills obsolete. The pervasiveness of IT, in particular, implies that this kind of flexibility will be needed throughout our society.

2. The report emphasises that education must be more relevant to industrial needs, and that both industry and the educational system must work to improve the links between them. An Education and Training Board is proposed within the SERC which would include representation from industry, academia and Government and would advise on priorities for courses. It would forecast manpower needs and would fund, with support from industry, specialised postgraduate courses aimed at building upon more general first degrees. The Committee recognise that there will be an increased demand for teachers and lecturers with appropriate skills and suggest that this should be met by differential payments for those teaching shortage subjects, and by more industrially-oriented initial, and in-service, training.

3. The Committee call for increased Government spending on the research base supporting new technologies and in financing the "switch" proposals, and for greater efforts to encourage girls to take up science and engineering. They recognise the contribution which industry must make and recommend that a national training policy is needed, supported by a levy, with acceptance by industry that training in specific skills is its own responsibility.

4. The report also highlights the importance of continuing education, through retraining and updating of skills. Industry is encouraged to sponsor relevant courses, with some Government support through the new Education and Training Board, and to exploit the potential of distance learning techniques, such as those employed by the Open University.

Science
Budgets
Part 2.



W.097

29 January 1985

MR BARCLAY, NO 10

*Ans
29/1*

— Come to AT 1pm 29/1.

- The attached minute could be given to the Prime Minister tonight on the eve of publication of the House of Lords report since the subject might be picked up in the Press and at Question Time. Alternatively it could be used as background before the 6 February meeting on the 'Switch'.

Robn

ROBIN NICHOLSON

CONQUEROR
LONDON



Caxton House Tothill Street London SW1H 9NF
Telephone Direct Line 01-213 6400
Switchboard 01-213 3000

The Rt Hon Sir Keith Joseph Bt MP
Elizabeth House
York Road
LONDON SE1

23 January 1985

SWITCH TO ENGINEERING AND TECHNOLOGY

I promised to come back to you after our meeting to see if there was any way in which I could make a contribution to the costs of your proposed engineering and technology "switch". As you know, I very much support the need for universities and colleges to give greater emphasis to the areas of engineering and technology where there are already such evident skill shortages in this country.

I am concerned however that it has not yet been possible to do more within the existing £3 billion budget for higher education in switching resources rather than additional inputs from Government. We discussed at the meeting the figures Peter Morrison had for the subjects where there is so clearly a surplus of graduates and there must surely be more scope for some cut back in these subject areas to help finance the expansion in priority areas. I would therefore hope that any support that we give in extra resources is additional to a substantial switch programme within the universities and colleges themselves.

Against this background, and recognising the difficulties which you explained in your minute, I have considered very carefully whether I could help out of our much smaller resources. I have identified £1 million in 1985/86 which, subject to the agreement of Peter Rees, I would be glad to make available to you as part of a package from all four economic

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departments. With matching contributions from Norman Tebbit, George Younger and Nick Edwards, together with the £3-4 million you mention from the UGC itself, this would be well on the way to providing the £10 million you are seeking in the first year. Whilst I can make no promise at this stage about the two following years, I would certainly be prepared to consider it at the appropriate time.

I am copying this letter to the recipients of yours.

Zu
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23 JAN 1985

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MINISTRY OF DEFENCE
MAIN BUILDING WHITEHALL LONDON SW1
Telephone 01-932 218 2111/3

MO 2/4/2

22nd January 1985

*Sub
29/1*

Dear David,

MAINTAINING THE STRENGTH OF THE SCIENCE BASE

My Secretary of State has seen a copy of your letter of 8th January to Elizabeth Hodkinson in Sir Keith Joseph's office, and has said that he supports the initiatives proposed by Sir Robin Nicholson and agrees that officials should work out the details as a matter of urgency.

I am sending copies of this letter to Elizabeth Hodkinson (Department of Education and Science) and to Richard Hatfield and Sir Robin Nicholson (Cabinet Office)

*Yours ever,
David Brennan*

(D BRENNAN)

D Barclay
10 Downing Street

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SCIENCE & TECHNOLOGY: maintaining
Strength of Science Base: Pt 2.

MINISTRY OF DEFENCE
MAIN BUILDING WHITEHALL LONDON SW1
Telephone 01 938 1000



23 JAN 1985





10 DOWNING STREET

MJ2 AAQ

coltwin
pls CDL

From the Private Secretary

10 January 1985

The Switch to Engineering and Technology

The Prime Minister discussed your Secretary of State's minute of 21 December when he came to see her on 3 January. He reported that if anything were to be done in the academic year 1985/86, decisions would be needed by end of February. His proposals would, over the next three years, cost around £10m. in the first academic year and £20m. in the two subsequent years. His minute had indicated a way in which his Department could contribute to this cost. He was also discussing with the Secretary of State for Employment ways in which he might make a further contribution. He suggested that when the Secretary of State for Employment had replied a further meeting should be held, under the Prime Minister's chairmanship, on whether the balance could be found from other Departments or from the Contingency Reserve.

The Prime Minister agreed to hold such a meeting (I am trying to set this up for the first week in February). She suggested, however, the meeting ought to consider what could be done to accelerate change in the balance of university courses in order to release resources for an increase in the output of relevant graduates. Your Secretary of State agreed to circulate a note on what would be involved in this.

I am copying this letter to David Peretz (HM Treasury), Callum McCarthy (Department of Trade and Industry), John Graham (Scottish Office), Colin Jones (Welsh Office), David Normington (Department of Employment), Leigh Lewis (Office of the Minister without Portfolio) and Sir Robin Nicolson and Richard Hatfield (Cabinet Office).

Andrew Turnbull

Miss C E Hodkinson
Department of Education and Science.

2



10 DOWNING STREET

From the Private Secretary

10 January, 1985

The Exploitation of Research Council Funded Inventions

The Prime Minister has seen your Secretary of State's minute of 19 December and that from Sir Robin Nicholson of 21 December. She discussed this question with him at their meeting on 3 January. The Prime Minister was disappointed that it was proposed to devolve rights in research only as far as the institutions, rather than to the individual researchers, as had been originally proposed. She considered that the interests of the taxpayer could be met by royalty arrangements. Sir Keith Joseph agreed to look again at ways in which individual researchers themselves could be given greater opportunities to pursue the exploitation of their research.

I am copying this letter to Callum McCarthy (Department of Trade and Industry), Richard Broadbent (Chief Secretary's Office), Sir Robin Nicholson and Richard Hatfield (Cabinet Office).

ANDREW TURNBULL

Miss C. E. Hodkinson,
Department of Education and Science

✓

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PLW 84



10 DOWNING STREET

From the Private Secretary

10 January, 1985

Prime Minister's Meeting with Secretary of
State for Education

Sir Keith Joseph came to see the Prime Minister last week to discuss a number of issues in the field of education. As a number of these raise questions of public expenditure I am, with his agreement, sending you a copy of the letter recording the discussion. I am also sending a copy to Richard Hatfield (Cabinet Office).

ANDREW TURNBULL

Richard Broadbent Esq
H.M. Treasury

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NBPM
AT
10/1

FROM: CHIEF SECRETARY
DATE: 8 January 1985

PRIME MINISTER

EXPLOITATION OF RESEARCH COUNCIL FUNDED INVENTIONS

see Flag F attached

I have read Keith Joseph's minute of 19 December about exploitation and the draft statement attached to it. I would like to make two points on it.

2 First, an important theme of the new arrangements is the need to delegate more responsibility to those who are actually doing the work. I support this and my officials have already put forward proposals for what we might do on Research Councils' commercial agreements. As far as the universities are concerned, the most important (and difficult) part of the exercise will be to decide how we assess whether the arrangements put forward by the institutions are satisfactory. I hope therefore, that the Treasury can be added to the list (in para 6 of the statement) of those involved in the assessment process.

3 Secondly, there is the question of receipts. Here, I think, Keith and I have different aims. I see them as a potential offset to Exchequer grant, and I believe the Public Accounts Committee will take the same view (on past experience, they will look for a split between the bodies receiving the receipts and the return to the taxpayer). Keith, on the other hand, seems to see them as an addition to grant.

4 However, what matters most at this stage is to encourage the Councils to start earning these receipts because until this happens, there is nothing to use for either purpose. To this end I want to cut through the argument and I suggest

that for three years (or until total earnings reach £5 million, whichever is the sooner), Councils should keep all their exploitation income. At the end of this, we should examine:

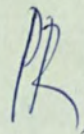
- (a) how the Councils have performed and their ability to judge winners;
- (b) what ~~it~~ cost them to achieve any receipts (administrative effort, scientists' time etc);
- (c) what they did with the money (having established at the outset that the first call on exploitation income was the cost of earning it).

In the light of this we must decide whether the Councils' behaviour was influenced by the receipts issue (or whether the problems were more fundamental) and also on a more permanent regime for receipts.

5 The last sentence of para 8 of the draft statement is fairly unexplicit but would allow for a review of this kind. If Keith agrees with what I have proposed above, I am content to leave it as it stands.

6 The position in universities is different in that it has been stated UGC policy for some time not to take commercial income into account in assessing recurrent grant. But though I see the need for incentives, I can see no reason either why the burden on the taxpayer should stay the same if and when universities succeed in earning significant sums from exploitation of research (research which has itself been financed by the taxpayer). I would therefore be grateful if Keith could arrange for officials here ^{to} be shown the figures collected each year on total earnings from this source (referred to in para 6 of the statement) so that we can take them into account, if necessary, during the PES discussions.

7 I am copying this minute to Norman Tebbit and to
Sir Robin Nicholson and Sir Robert Armstrong.

A handwritten signature in blue ink, appearing to be 'PR' or similar initials, located above the typed name.

PETER REES

COMBUSTOR

REC JAN 19 1966

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10 DOWNING STREET

From the Private Secretary

SIR ROBIN NICHOLSON

Maintaining the Strength of the Science Base

The Prime Minister was most grateful for your minute of 2 January, and for your report on the proposal that £20 million might be transferred from the Ministry of Defence Research budget to the Science budget.

The Prime Minister accepts your conclusion that a direct transfer would not be appropriate, and she welcomes your proposals for increasing the MOD spend in the Universities without increasing the Department's overall research expenditure. I have sent copies of the report to the Private Offices of the Secretary of State for Education and Science and the Secretary of State for Defence, together with the attached covering letter. As you will see, the Prime Minister is anxious to maintain the momentum of your proposals, and has asked for a report of progress in a month's time.

David Barclay

8 January 1985

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10 DOWNING STREET

From the Private Secretary

8 January 1985

Maintaining the Strength of the Science Base

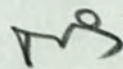
My letter of 30 July 1984 to Richard Mottram recorded that the Prime Minister had asked Sir Robin Nicholson to examine the proposal that £20 million of MOD Research funds might be deployed to support research in the University and Research Council system.

The Prime Minister has now received Sir Robin's report, and has asked me to send copies to your Secretary of State and to the Secretary of State for Defence. The Prime Minister commends the proposals contained in it, which she understands also have the broad support of the Chairman of the ABRC and of the Chief Scientific Adviser to the Ministry of Defence.

The Prime Minister hopes that your Secretary of State and the Defence Secretary will agree that officials should now be asked to work out the details of the initiatives proposed by Sir Robin as a matter of urgency, so that they can take effect as soon as possible and certainly not later than the academic year 1986/87.

The Prime Minister would be grateful for a report on progress in a month's time.

I am sending copies of this letter to Richard Mottram (Ministry of Defence) and to Richard Hatfield and Sir Robin Nicholson (Cabinet Office).


David Barclay

Miss Elizabeth Hodkinson
Department of Education and Science

CC MASTRA

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File VC3 AAT



bcc: O. Letwin
P. Grogson.

Education: GP
R 4

10 DOWNING STREET

From the Private Secretary

4 January 1985

Dear Elizabeth,

PRIME MINISTER'S MEETING WITH THE SECRETARY
OF STATE FOR EDUCATION

Your Secretary of State came to see the Prime Minister yesterday to discuss various issues in the field of education. Sir Keith said he was concerned about the prospect of continuing disruption by teachers, led by the NUT. Talks had been going on with the teachers to devise a package which, in return for a proper definition of their duties, a system of performance appraisal and greater ability to dismiss sub-standard teachers, would offer them merit pay and better opportunities for in-service training. To the disappointment of the other unions, the NUT had unilaterally withdrawn from these talks.

Sir Keith said he wanted to avoid putting the Government in a negative light. There was a danger that continuing disruption of schools, with children frequently being sent home, could turn public opinion against the Government and could result in an excessively generous pay award being made without securing any of the Government's other objectives. If some positive move could be made by the Government it might be possible to hold public opinion and isolate the NUT.

Proposals had been made by ACSET for more in-service training which would help raise teaching standards. It would also make it easier to identify inadequate teachers if their performance was still poor even after undertaking training. The costs of the proposals could be up to £50 million. He expected to be able to find half from within the RSG but, with the Prime Minister's agreement, he wished to approach the Chancellor to see if additional resources could be found for the rest. The Prime Minister agreed that the Chancellor could be approached though she expressed scepticism about some aspects of the proposals. She doubted whether the better teachers needed substantially more training and she felt that it would be necessary to confine any extra training to specific subjects. Your Secretary of State said that, after consulting the Chancellor, he would circulate a paper to H Committee.

The Prime Minister asked what powers head teachers had

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for deciding on the way money devoted to particular schools was spent. Sir Keith said they were able to switch non-teaching resources but he would consider whether these powers should be widened in the Bill in the next session needed to re-allocate powers between education authorities, parents and teachers. He mentioned that he was looking again at ideas for creating direct grant primary schools.

The discussion then turned to the Green Paper on Higher Education. Your Secretary of State said he had noted the Prime Minister's doubts about the way in which he was proposing to carry out the review of student support. He did not think a Fowler-type review, in which consultation and development of policy options went more or less hand in hand, was appropriate. It was essential for the Department to set out clearly the implications of various types of loan schemes. If this were not done, the discussion would range over a number of options which the Government could not contemplate. For example, a number of Government supporters who espoused the cause of loans had done so in the belief that they would be interest free.

The Prime Minister wondered whether, in the longer term, it might be better to establish a system of scholarships, which would be allocated for specific subjects. Those not winning scholarships would receive free tuition but would have to meet the full cost of supporting themselves. Sir Keith agreed to look at this but felt that the administration of such a scheme would be extremely difficult.

Sir Keith said he hoped to produce the Green Paper on Higher Education in the spring. It would canvass a number of radical options, eg for the rationalisation of weak departments in universities, but there would still remain a limit on the extent to which the Government could influence directly the courses which universities provided. Direct controls would infringe the academic system; he preferred to use a loan scheme to influence the choice students made away from non-vocational courses.

Any moves to re-structure the balance of university courses would run into the problem of redundancy. Ministers had agreed to end tenure for future appointments but closure of departments would require redundancy compensation which would be very expensive. The Prime Minister thought that, nevertheless, this option should be explored. She also asked whether universities could complete degrees in two four-term years. Sir Keith said this was an option which was being offered to universities.

The discussion then turned to the switch towards engineering and technology. Sir Keith said decisions would be needed by end February if anything were to be done in the academic year 1985-86. The cost of his proposals over the next three years would be £10 million, £20 million, £20 million. He was discussing this with Mr. King and, between them, they hoped to find between one-third and one-half of the cost. He hoped the rest could be found

ther from the Contingency Reserve Fund or from other departments. He suggested the Prime Minister hold a meeting in early February to resolve this question. The Prime Minister said other Departments would be reluctant to find additional resources while they saw large numbers of students continuing to study for low priority degrees. Nevertheless, it was agreed that she would hold a meeting which would consider a two-stage approach - an agreement on funding to get the switch started and, for the longer-term, the merits of making extra money available to accelerate re-structuring within universities.

The Prime Minister said she had seen Sir Keith's proposals on the exploitation of Research Council-funded inventions. She was disappointed that it was proposed to devolve rights in the research only as far as the institutions. She thought that individual research should be given greater opportunity to pursue exploitation of their research themselves. Your Secretary of State agreed to consider how this could be done.

*Yours sincerely
Andrew Turnbull*

ANDREW TURNBULL

Miss Elizabeth Hodkinson,
Department of Education and Science.

E.B.

G)

PRIME MINISTER

The Science Base

Robin Nicholson concludes that a direct switch of £20 million from MOD to the science budget is not the most sensible way of proceeding.

He suggests a series of measures designed to increase MOD's spending in the universities, without increasing its overall expenditure on research. At present MOD spend a paltry £9 million a year in the universities, out of a £340 million budget.

Robin's proposals are summarised in paragraph 8 of his covering minute (Flag A). If you have time, you may also like to read through the annex (Flag B), in which he sets out some more personal reflections.

Agree that we should now send the report (but not the annex, at Robin's request) to Mr. Heseltine and Sir Keith Joseph - for comment in the first instance, but then if they agree for detailed work by officials with a view to implementing Robin's proposals as soon as possible?

DMB

4 January 1985

Yes - Thank you
I hope we shall
press ahead with
these proposals
Progress report within
1 month please
mf



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PRIME MINISTER

MAINTAINING THE STRENGTH OF THE SCIENCE BASE

Sir Keith Joseph wrote to you after your Lancaster House seminar saying that if the strength of the UK science base was to be maintained, the Science Vote should be increased and that redeployment of funds from some other expenditure programmes (eg defence) should be considered. After correspondence on the matter with him and the Secretary of State for Defence, you asked me to examine the proposal that £20 million be transferred from the MoD research budget to the Science Vote.

I have examined this proposal and enclose my report. I have concluded that the best immediate course of action is to develop some new ways of working which will improve the links between MoD and the wider scientific community and which should, in the medium term, lead to closer collaboration and more efficient utilisation of research funds. Provided the scientific community responds well, I believe the proposals will lead to a significantly enhanced MoD spend in University research and thus offer some indirect relief for the Science Vote. I have reached broad agreement with the Chief Scientific Adviser (MoD) and the Chairman of the Advisory Board for the Research Councils (ABRC) on the basis for the proposals set out in my report but the Annex to my report contains my own value judgements.

I recommend that, if you approve of the suggestions made in my report, you send it to the Secretaries of State for Defence and Education and Science seeking their agreement that the proposals be worked up by officials from the two Departments.

There remains the question of a direct transfer of funds from MoD, or elsewhere, to the Science Vote. I have concluded that it would not be appropriate to recommend a transfer without looking more widely at the allocation of R & D expenditures between all Departments and considering



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national needs. The mis-matches, which I believe do exist, cannot be solved by discussions involving just two Departments and I would wish to minute you again on this broader issue.

I am copying this minute and my report to Sir Robert Armstrong.

PBN

ROBIN NICHOLSON
CHIEF SCIENTIFIC ADVISER

Cabinet Office
2 January 1985

CONQUEROR
LONDON

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MAINTAINING THE STRENGTH OF THE SCIENCE BASE

REPORT BY THE CHIEF SCIENTIFIC ADVISER, CABINET OFFICE

Background

1. After the Prime Minister's Lancaster House Seminar on Science, Technology and Industry, the Secretary of State for Education and Science wrote to the Prime Minister saying that the UK's strong science base would not be maintained unless the Science Vote was increased. He suggested that " ... one possibility might be to redeploy funds for some other expenditure programme. The one that seems to me relevant in this context is the very large expenditure on defence research and development."

2. Following subsequent discussions of this idea, the Prime Minister asked me to examine the proposal that £20 million per annum be transferred from defence R & D to the Science Vote with a view to clarifying the way in which such a transfer of responsibility for research could be carried out, the methods which could be used to maximise the advantages and minimise the disadvantages, and the likely outcome in terms of the strength of the scientific base of the country as a whole and the MoD's ability to use this base to fulfil its responsibilities for the defence of the country.

3. I have discussed the idea in depth with the Chief Scientific Adviser MoD and the Chairman of the Advisory Board for the Research Councils, and I have sought the views of the Chairman of the Science and Engineering Research Council (SERC) and the Chief Engineer and Scientist, Department of Trade and Industry, about some aspects of the proposal.

Conclusions and Recommendations

4. The MoD already places contracts with University researchers worth £9 million p.a. and has other links with the Research Council/University System. Nevertheless, I believe there is an urgent need to further enhance these links so that the high quality human resources in the country's Universities can be more fully utilised to enable the MoD to meet the technical requirements of HM Armed Forces in a period of decisive scientific and technological advance.

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5. I have concluded that there are some immediate measures which can be taken. I propose a series of specific initiatives (listed below) which I believe would enhance MoD's scientific and technological base, harness the under-utilised human resources of the Research Council/University system to the country's defence needs and save money in certain expensive areas of research.

6. If these initiatives are adopted there will be an increase in the MoD's spend in the University/Research Council system which, depending on the quality of the latter's response, could reach or even exceed the figure of £20 million p.a. But there need be no increase in MoD's R & D spend. I envisage that the initiatives would replace some activities in the MoD's current research programme and would also reduce the cost of MoD's development programmes through starting these on a better scientific base.

7. Security will be a problem in some of the initiatives I propose but American experience shows that it need not be an insuperable problem if there is foresight and willingness to find solutions on both sides. We can no longer afford to make security a convenient excuse for inaction.

8. The proposed initiatives are as follows:

a. A collaborative research grants scheme should be set up between MoD and the Research Councils to jointly fund and jointly carry out programmes of strategic and applied research in Universities and Defence Research Establishments/defence industry laboratories. The scheme would be on similar lines to the existing successful SERC scheme between Universities and private sector industry.

b. MoD and SERC/NERC should jointly plan and fund future activities of mutual interest so that one side or other has clear leadership for each activity. Major and specialised facilities should be designed with joint use in mind. Activities which should be considered include oceanography, materials and remote sensing, and facilities should include high power computers, research ships, molecular beam epitaxy, synchrotron light sources and P3 laboratories. These are only examples from what should be a long list of activities and facilities.

c. At the same time as (b) above, consideration should be given to a more

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equitable means of meeting the cost of current areas of research of mutual interest (eg lasers) and a review of existing facilities should be carried out.

d. Both Research Council/ University and MoD researchers would benefit from experience working outside their own organisations; however, exchanges of personnel have proved difficult to implement. Therefore more flexible arrangements should be made by setting up two separate schemes to encourage movement of staff from MOD to the Research Council/University system and vice versa. Periods of secondment from a few weeks to 2 years should be available.

9. These initiatives should start as soon as possible and in any case not later than the academic year 1986/87.

ANNEX

Needs and Resources

1. The MoD spends £371 million pa on research, £207 million is spent intra-murally in Defence Research Establishments (DREs) and £164 million extra-murally; of the latter, £9 million is spent with Universities and the remainder in industrial laboratories, Research Associations etc. The intra-mural capability is being reduced through reductions in staff numbers at all establishments. With one or two exceptions there is difficulty in recruiting high quality young staff especially in scarce skills. There is therefore concern at the ability of the DREs to continue to supply the scientific and technological capability required by a modern fighting force.

2. Following the Strathcona review, the DREs have instituted a core programme of strategic research known as BRAC (Basic Research Advisory Council) in each establishment amounting to about 5 per cent of the available effort. Nothing I am recommending in this minute should be taken to be threatening to BRAC. Indeed I conclude that BRAC as presently constituted may be sub-viable in size and scope and my proposals for strengthened financial and people links with Universities should also strengthen the viability and effectiveness of BRAC.

3. British University research is highly regarded at home and abroad. Significant reductions in the volume of research which the Research Councils are able to place in Universities have not been offset by reductions in the number of active researchers in Universities - more than 30 per cent of alpha grant applications have to be rejected. Faced with this under-resourcing, researchers are seeking funds from abroad, moving abroad themselves, or partially 'retiring' from research. The United Kingdom would benefit if a means was found to keep University researchers actively involved with strengthening the UK science base.

4. The need in MoD and the over-supply in the Universities could be met by a transfer of researchers from Universities to MoD. But this is neither a practical nor realistic solution - instead my proposals aim to leave the people where they are and make some of the high quality research capability of

the Universities available to MoD.

Current links and a comparison with the USA

5. There are some excellent links between MoD and Universities at the current time. But a proportion of these links date back to the immediate post-war period and there are not enough younger researchers, with experience of defence, replacing them. A more positive move to reverse this would assist the DREs to overcome structural imbalances of staffing and better guarantee their medium term capability.

6. MOD links with Universities, and the amount of extra-mural research placed with Universities, are believed to be limited variously by security considerations, the availability of University researchers with the requisite skills and the anti-defence attitude of Universities. While any or all of these may be a problem from time to time I am not convinced that, separately or together, they need prevent the successful operation of the proposals I have made.

7. The £9 million p.a. spent by the MoD on extra-mural research in Universities (3 per cent of the MoD research budget) contrasts with the \$400 million spent by the American Department of Defence (DoD) on strategic research in Universities. The United Kingdom defence research programme has nothing to compare with the large applied research contracts placed in the USA with certain specialised University laboratories eg \$224 million in Johns Hopkins University and \$197 million placed in the Lincoln Laboratory of MIT. American DoD experience suggests that there are substantial benefits to be gained from a significant involvement of Universities in defence research.

8. The Links between MoD and Universities can be enhanced by collaborative research projects, shared use of major facilities and exchange of staff. These ideas form the basis of the proposals listed in the report and amplified below.

Collaborative Grants Schemes

9. The SERC collaborative grants scheme has been operating successfully for 5 years. It allows for joint applications from industrial research laboratories and University laboratories to be made for joint research projects. The

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industrial share of the cost of the project must be not less than 50 per cent of the total but the work may be carried out in either or both laboratories. The DTI has also developed a collaborative scheme: the Joint Opto-electronics Research Scheme (JOERS).

10. Some of the present alpha quality grant applications could, perhaps with modification, be suitable for submission as joint MoD/University projects, for joint funding under the proposed collaborative grants scheme. In addition, as has clearly happened in the present SERC scheme, MoD and University researchers would stimulate each other to produce entirely fresh, exciting projects of high quality and strong defence relevance which would win alpha rating in the assessment process. Naturally this would reduce the pressure on non-defence-related alpha applications to the Research Councils.

11. In the Alvey programme, MoD and the DTI are working with SERC to support collaborative projects involving Universities, REs and industry. There are other subjects in which these organisations share a common interest and in which they are all active: for example, advanced manufacturing technology and materials science. Collaboration does not often take place naturally with existing arrangements and so a three-organisation development of the proposed MoD/Research Council scheme is worth considering.

Joint approach to major new areas of science and technology

12. I have been impressed by the way the military and civil organisations in the USA jointly plan future scientific and technological activities in such a way that one or other leads in a major facility which is then constructed to serve the needs of both. Lasers are a good example of the working of this approach in the USA. In the United Kingdom we have costly facilities on both sides of the military/civil divide which are no longer world class. The United Kingdom simply cannot afford to continue this approach: MoD, the Research Councils and other civil research establishments, such as UKAEA, must whenever possible integrate their requirements to a single facility in future and costs should be shared.

Interchange of Staff

13. There is a need to encourage the secondment of University staff to MoD

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Research Establishments. This could be along the lines of the Research Councils' Senior Research Fellowship schemes, whereby University staff are released for 2 or 3 years from teaching to do full time research. MoD REs would gain from the introduction of new blood into their ageing population at Principal level and by attracting some new recruits. MoD, in reimbursing the academic's salary, would enable the University to employ a younger academic on a temporary basis, thus also gaining new blood. The scheme might be extended to include industrial companies which specialise in defence equipment.

14. A reverse scheme is also desirable whereby MoD scientists spend periods in Universities to gain first-hand exposure to new thinking in key subjects, understand and learn to use new techniques and generally 'recharge their batteries' through the stimulus of participating in active, high quality, basic research.

Costs

15. All the proposals I have made are 'quality - and relevance - led' in the sense that if the DREs and Universities do not respond in a way I believe to be in the national interest and their own interests, then the initiatives will fail.

16. However I am confident that they will respond and that as a result the MoD spend in the University/Research Council system could reach, or even exceed, the £20 million pa figure introduced at the start of this study. However there need be no increase in the MoD R & D spend as a whole, indeed I would expect a decrease for the following reasons:

- a. the MoD research programmes will become more effective as a result of the input of the skills of University researchers and hence the cost to the research part of MoD's budget will be less;
- b. more effective research programmes will save substantial sums of money through better targetted development programmes where the really large MoD expenditure is;
- c. money will be saved through the joint planning and use of major research facilities.

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Sci + Tech : Budget Pt 2.

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F2 JAN 1985



~~SECRET~~
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W.08

2 January 1985

PRIME MINISTER

THE SWITCH TO ENGINEERING AND TECHNOLOGY

21.12.84 : In Meeting Folder for 31185

I have seen the minute to you from the Secretary of State for Education and Science on the subject of the switch in student output towards engineering and technology. As I indicated to you in my minute of 27 November 1984, I believe that urgent action to increase the output of graduates in special engineering disciplines is necessary if economic growth is not to be stunted by lack of skilled people.

2. I therefore support the Secretary of State's proposals and hope that the economic Departments will respond appropriately so that a scheme of worthwhile size can be launched.

3. However I am most concerned that the Secretary of State proposes to find the money at the expense of the Muir Wood proposal for a 'seedcorn' fund to encourage industrially relevant research at Universities. This proposal, which came from the ACARD report which you commissioned, "Improving Research Links between Industry and Higher Education", has been with Government since July 1983.

4. Muir Wood found a need to provide an incentive for Universities to work with industry in their research by rewarding those who did so. He suggested that the public funding of Universities through the UGC should be partly related to their success in obtaining research contracts and grants from industry, say on a basis of £1 public funding per £4 industrial funding.

5. This proposal may be simplistic in its mechanics but the principle has been widely welcomed except (predictably) in those parts of our education system where the tradition has been to use public funds to subsidise failure rather than reward success. I have spoken to Sir Peter Baxendell whose views are referred to

in paragraph 4 of the Secretary of State's minute, and he has assured me that he and other industrialists welcome the Muir Wood principle and their objections were only raised against some extremely complex mechanics involving an army of accountants which the UGC had put forward to implement the principle.

6. I believe it would be contrary to the Government's overall policy towards higher education and its links with industry if the Muir Wood principle were to be rejected. On the other hand, I am reluctant to jeopardise the start of the 'switch'. I therefore suggest that if you accept the Secretary of State's proposals for 'the switch', you ask him for a commitment that his Department will bring forward a properly financed and worked through scheme to implement the Muir Wood principle by Easter at the latest. It would be intolerable if we reached the second anniversary of an ACARD report which you commissioned without a positive Government response to a proposal which so clearly corresponds with the Government's objectives.

7. I am copying this minute to Sir Robert Armstrong.

R.N.

ROBIN NICHOLSON
Chief Scientific Adviser

Cabinet Office
2 January 1985

F2 JAN 1985





COVERING CONFIDENTIAL

W04

2 January 1985

MR BARCLAY
No 10

Dms
4/1

MAINTAINING THE STRENGTH OF THE SCIENCE BASE

In response to your minute of 30 ^{Part 1 -} July 1984 to Richard Mottram, setting out the Prime Minister's request that I should examine the proposal to transfer £20m from the MOD research budget to the Science Vote, I have considered the matter with the Chief Scientific Adviser MOD and the Chairman of the Advisory Board for the Research Councils.

I enclose my report to the Prime Minister with a covering minute. The Annex contains some additional information and some value judgements of my own but it is not essential reading for the Prime Minister.

I have suggested that the Prime Minister sends my report (without the Annex) to the Secretaries of State for Education and Science and Defence. I therefore enclose a draft covering minute for her consideration.

RBN

ROBIN NICHOLSON

CONFIDENTIAL

DRAFT LETTER FOR THE PRIME MINISTER TO SEND TO THE SECRETARY OF STATE FOR
EDUCATION AND SCIENCE

*✓ will recall that - My letter of
30 July 1984 to Richard Mottram
concerned a report*

MAINTAINING THE STRENGTH OF THE SCIENCE BASE

the
Following ~~my~~ Lancaster House Seminar on Science, Technology and Industry, your
SofS wrote to the PM
~~wrote to me~~ saying that a strong UK science base could only be maintained if
the Science Vote was increased and suggesting that funds from another
expenditure programme, such as defence R & D, be redeployed for this purpose.
We have discussed the matter subsequently and you and Michael Heseltine
commented on a proposal to utilise £20 million of MoD research funds to support
research in the University and Research Council System.

In July, I asked Robin Nicholson to examine the proposal more closely and my
specific questions were set out in David Barclay's letter to Richard Mottram of
30 July 1984. I have now received Sir Robin's report and commend his
recommendations to you; a copy of his report is attached. I understand that his
proposals have the broad support of the Chairman of the ABRC and the Chief
Scientific Adviser MoD.

I hope that you and Michael Heseltine (to whom I am copying this letter) can
agree to the proposals and will instruct officials from your Departments to
work out the details of all the proposed initiatives as a matter of urgency so
that the initiatives can start as soon as possible and certainly not later than
the academic year 1986-87.

PRIME MINISTER

Meeting with Sir Keith Joseph

i) Higher Education Policy

Fl 111
- Sir Keith's minute of 21 December

DES have been planning a Green Paper in the spring but this was given further impetus in the discussion on the "switch". You suggested that you hold a meeting to discuss the role of the universities and government's relations with them but before embarking on this, Sir Keith Joseph wanted to have a discussion with you first. The object is to find a way of exerting further influence over the balance of courses which universities provide without having recourse to a major structure of controls which would damage academic freedom. This raises the question of tenure where it has been agreed to legislate to remove tenure from the future appointments while leaving existing tenure intact. This will limit the speed of future change in the balance of university teaching and Sir Keith argues that more money will be needed to finance redundancy if the process of change is to be speeded up.

ii) The "Switch"

- Sir Keith's minute of 21 December
- Sir Robin Nicholson's minute of 2 January

Sir Keith has been engaged in discussion with other Departments and the UGC to see if some resources can be found at least to get the "switch" underway in the short-term.

iii) Science Budget (no papers)

Sir Keith may want to discuss the question of science generally though I do not know whether he has any new ideas or proposals to put forward on the subject. He may well press again the case for resources to be made available for redundancy payments.

iv) Student Support

Flag D - Sir Keith's letter of 21 December to the Chancellor

You expressed reservations about the way in which Sir Keith intended to conduct the review. He has proposed that the drafting of the document should take place within the Department, with consultation to follow. You may feel that a Fowler-style review, where consultation and the development of policy options run hand in hand, may be better. At the same time, you might want to raise the question of whether students should continue to be eligible for SB and HB - see David Young's letter of 21 December.

v) Exploitation of Research Council Inventions

Flag F
Flag G - Sir Keith's minute of 19 December and Sir Robin Nicolson's minute of 21 December

You were disappointed in the proposal to devolve rights in research to institutions as opposed to the individual researcher. Is it not possible to combine both approaches with rights going to the institution in the first instance with individual researchers having the opportunity to exploit an invention in return for a royalty?

vi) Teachers' Pay, Assessment and Training

The issue is whether there should be a bargain with teachers where, in return for conceding assessment and the weeding out of poor teachers, the teaching profession is given somewhat better pay scales, merit awards, and improved in-service training.

vii) Education Block Grant

DES favour a separate block grant for education instead of the current system of notional allocation within AEG. Sir Keith may seek to convert you to the idea.

viii) Economic Awareness

You have expressed reservations about Sir Keith's proposals for the teaching of the "economic facts of life". The question is whether, without further training itself, the existing teaching profession is capable of imparting the sort of economic awareness that the Government wishes to see.

AT

2 January 1985

PRIME MINISTER

MEETING WITH SIR KEITH JOSEPH: 3 JANUARY

You may wish to discuss two issues:

(i) The 'switch' to engineering and technology in universities;

(ii) the management of higher education.

1. The Switch to Engineering and Technology

Keith Joseph offers to scrap the UGC's 'industrial seed corn' fund, and to use the £3 million p.a. as his contribution towards increasing the provision of Information Technology in universities.

We believe that this is a bad idea.

The 'seed corn' fund would reward universities for attracting extra money from industry. A university would receive X pence additional grant for each £1 of industrial funding. This would induce universities to co-operate more with industry and to raise more private funds. It would provide an invaluable push towards the long-term goal of increasing university independence from the taxpayer. Even if short-sighted businessmen and university administrators do not like the prospect of such independence, they should be given strong incentives to achieve it.

If the 'seed corn' money were removed to fund new courses in information technology, the long-term gain of greater industrial funding would be sacrificed for a short-term purpose. As a result, a few years from now universities would doubtless be coming back for more money to spend on IT or whatever else was needed - without

having done anything in the meantime to increase independent funding.

The money for the switch to information technology should be found either from reduced funding for weak university departments in other fields or from other government departments or from the private sector.

2. The Management of Higher Education

All the options discussed in Keith Joseph's paper on the management of higher education involve increased action from the centre. He is supported in this by David Young. But we believe that it is entirely the wrong approach.

In higher education as elsewhere, long-term efficiency depends not on ever closer central inspection but on ever greater connection with, and responsiveness to, the private sector. If you wish to make the universities more economically useful, the right thing is to force them to raise more money by charging for courses, doing contract work for industry, raising private donations, etc.

There is no chance of privately funded institutions like Cranfield and Buckingham being inefficient or unresponsive in the long run: they would very quickly collapse. It is the cushion of taxpayer's support that allows other institutions of higher education to doze pleasantly while Cranfield and Buckingham alter and adapt.

3. Conclusion

We suggest that you should ask Keith Joseph:

(i) to return the 'seed corn' fund giving universities incentives to raise industrial money;

(ii) to find money for the 'switch' from weak university departments in other fields or from other government departments or from the private sector;

(iii) to propose means of increasing efficiency and higher education not by additional central planning but by exerting additional pressure on higher education to respond to the private sector.

Linda Reed

RP Oliver Letwin

28 December 1984

SLHAGG

NO

CONFIDENTIAL

CONF

B

PRIME MINISTER

THE SWITCH TO ENGINEERING AND TECHNOLOGY

At the meeting of E(A) on 28 November when my paper E(A)(84)63 was discussed, a number of major questions of higher education policy were raised. I am sending you a separate minute on that issue which we are to discuss shortly.

2. Meanwhile and independently of any wider-ranging action we may wish to take in the longer term, I think we need a decision on the question I put to E(A) in my paper E(A)(84)63: namely should the Government take an initiative to secure an increase in the output of relevant graduates from the universities? Expectations have been aroused as a result of the representations of the Engineering Council, John Butcher's IT Skills Shortages Committee and the creation of a new Institute of Information Technology at Milton Keynes. As I said in my paper I believe that a new initiative by the Government would be the trigger for more effective co-operation between universities and industry than has been secured in the past. The matter is now urgent. We need a decision by the end of February if anything is to be done in the academic year 1985-86.

3. At the E(A) meeting you expressed surprise that the universities could not find the money. I went into that before I circulated my E(A) paper. The UGC is very short of funds as a result of the 1981 cuts, the gap between the provision for pay in their programme and the pay settlements and the decision we took a year ago to reduce their resources on the assumption that

CONFIDENTIAL

they would find ways of saving the amounts in question. £36 million that might have been redeployed was thus withheld from them.

4. In the light of your concern, I have had further consultations with the Chairman of the UGC, Sir Peter Swinnerton-Dyer. He reminded me that, at my request, he had reserved a sum of £3-4 million in each of the next three years in order to launch a "seedcorn" fund of the kind recommended last July by the Advisory Council for Applied Research and Development Working Party under the chairmanship of Sir Alan Muir-Wood. (You will recall that the purpose of such a fund would be to stimulate research links between universities and industry - the money would be distributed as a reward for achieving increases in profitable contracts with industry.) Sir Peter put the proposal to his Committee on 14 December and quite serious doubts were expressed about whether the rewards which could be provided would really act as much of an additional incentive, about whether a system could be devised which reliably took account of the profitability of contracts entered into, and about the extent to which any system might be manipulated. I am told that the businessmen on the UGC - who include Peter Baxendell of Shell Transport and Trading - were amongst the most sceptical.

5. In view of the UGC's cautious reaction to the "seedcorn" idea and my renewed enquiry about increasing IT graduate output, Sir Peter tells me that he would consider it appropriate, if Ministers wished, to ask his Committee to agree to divert the money from the one purpose to the other. Neither he nor I would think this £3-4 million a year on its own a credible response to the pressures

CONFIDENTIAL

for a switch to IT. My judgment is that a total of something like £10 million in the academic year 1985-86 and £20 million in each of the next two academic years would be required to make a significant impact on the problem and to secure a positive response from industry.

6. The case for an increase in IT graduates has been pressed on me vigorously by the economic departments. I therefore consider it reasonable that they should make a contribution to match that of the UGC. I put this suggestion to Tom King at a meeting on 20 December. He is considering whether, and if so to what extent, he might help and will let us know by mid-January. At that stage I think it would be very helpful if you would take a meeting to discuss the matter further with Norman Tebbit, George Younger and Nick Edwards, as well as the Chancellor, Tom King and David Young.

7. I am copying this letter to them and also to Sir Robert Armstrong.

KJ.

21 December 1984.

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Ovo

Prime Minister:

~~CNO~~

9

Sir Keith Joseph's minute is

W.0945

attached. His proposals stop short of full devolution

21 December 1984

PRIME MINISTER of responsibility to researchers, but Dr Nicholson concurs. Agree proposed

EXPLOITATION OF RESEARCH COUNCIL INVENTIONS

Statement?

No - 1
see no reason why
21/12

You announced the lifting of the BTG monopoly on the exploitation of inventions developed with Research Council funds more than a year ago and the proposed policy statement by the Secretary of State for Education and Science is intended to define the new arrangements.

an individual researcher should be allowed

2. Like the Secretary of State, I had originally been in favour of new arrangements in which authority and accountability were more fully devolved to the individual researcher. But, again like him, I have become convinced that such an enormous step from the present protective bureaucracy would not be wise and might, indeed, jeopardise the whole process of liberalisation of exploitation of research through the occurrence of a few "scandals". But the proposed arrangements do go a very long way towards opening up the system and encouraging a much more commercially-minded approach within the research environment. It also allows the direct involvement of the private sector in the exploitation process and so can be seen to meet both the spirit and the letter of your Lancaster House announcement. Indeed the rapid increase in the last year of private sector companies involved in technology transfer is an encouraging sign for the future.

why?

the right to dump his own research in this country & be within. We can meet the other funds privately developed in research

3. The longish delay between your announcement and the statement on the present proposal indicates the difficulty in reaching a position acceptable to all Departments. I recommend that this proposal is accepted and that the transfer of responsibility for exploitation to the Research Councils, and on to the Universities, is carried out as soon as is practicable.

RNSN

ROBIN B NICHOLSON
Chief Scientific Adviser



PRIME MINISTER

IT SKILLS SHORTAGES

At EA on 28 November a number of comments were made about strengthening the links between industry and the academic world and the need to bring market forces to bear more strongly and more flexibly on the higher education sector. The IT Skills Shortages Committee, which consists of representatives of industry and the academic world as well as Government Departments, had already considered most of the issues raised in EA, and I thought therefore it might be timely to reaffirm some of the main conclusions and recommendations for action contained in the Committee's first report ("The Human Factor - The Supply Side Problem") published in July.

2 The Committee agreed that skill shortages are now so acute that additional financial resources for higher education should be made available from the private sector. In line with the report's recommendations of a "New Partnership" between academia and the private sector, the CBI have recently confirmed their readiness to help and 29 leading IT producers and users are now members of a new IT Skills Agency under the CBI Foundation for Education.

3 First, the ITSA has pledged to provide up-to-date equipment to replace much of the obsolete hardware currently in use in our universities and polytechnics.

4 Second, the Committee agreed that industry should make additional manpower resources available, and again the CBI has confirmed its willingness to urge its members to loan key executives as visiting professors or lecturers. The exchange will not be all one-way - industry will also provide consultancy and employment opportunities to academics, and there will be joint development of conversion courses, updating programmes, increased sponsorship of students and increased opportunities for students to gain work experience.

5 Third, industry has confirmed its willingness to enter into training partnerships, possibly in the form of "training companies" with equity participation from industry, to encourage development of courses specifically tailored to meet industry's needs.

6 Fourth, the CBI will be making available to members details of how, through the use of charitable foundations, industry can ensure that its support for higher education can be made most cost-effective from the tax point of view.



7 Sir Henry Chilver has already announced the launch of a new private sector higher education Information Technology institution to provide, in particular, conversion courses on contract to industry and to undertake research. Leading firms have already pledged their support up to £15m. John Ashworth has already won industrial support of up to £5m for a similar venture at Salford.

8 Industry, therefore, is already on the move. The members of the Skills Shortages Committee feel that if we are to maintain this private sector momentum and commitment, which could amount to some £50m, there must be some commensurate move from Government to increase undergraduate places for electronic engineering, computer sciences, mathematics and physics.

9 The industrial members of my committee are already suspicious that the Government may "simply stand on the touchline applauding and then walk away". This would damage our credibility and risk leaving industry's initiative to wither in disillusionment at a time when many are anxious to forge market-driven links between industry and the H.E. institutions. Industry cannot do all that is required by itself. Welcome though it is, the support we are promised from industry will not by itself add a single IT undergraduate to the higher education system. Conversion courses are valuable, and donations of equipment and loans of staff will provide indispensable infrastructure, but if the existing skills shortage already identified (and which will become crippling if nothing is done) is to be overcome, there must be an increase in first degree students in the information technology field. Even Sir Henry Chilver can see no way of educating undergraduates without some Government contribution.

10 I fully recognise the difficulty at the present time, of finding spare resources even for the most pressing of needs. That is why the DTI and I have been so anxious to concentrate on securing additional resources from the private sector in the ways described above. But even allowing for the market-driven approach between industry and academia under the new partnership, industry will require an increased undergraduate baseline as a minimum position against which the new proposals can be brought into operation. I believe - and Norman Tebbit agrees with me - that the Government will have to help make this possible by making a contribution through the "Switch". I fully appreciate that other, broader issues are at stake but in the short term there is a danger that the development of information technology in the UK - with all that this implies for our industrial future - will be restricted, perhaps critically, by shortage of qualified manpower.



11 I am sending copies to Keith Joseph, Tom King,
George Younger, Nicholas Edwards, David Young and
Peter Rees.

JB

JOHN BUTCHER

21 December 1984

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MR. TURNBULL - on return

Meeting with Sir Keith Joseph

Sir Keith Joseph has asked for a private meeting with the Prime Minister, which we have arranged for 1700 on Thursday 3 January.

I understand from Elizabeth Hodgkinson that Sir Keith is likely to raise three topics:

1. Higher education policy in general - he will be sending across a minute on this before the meeting. *Copy to go today.*

2. "Economic awareness" - his proposals for increasing economic awareness in schools, and the Prime Minister's comments. *No further papers*

✓3. Teachers' pay - he will not be asking for money directly, but will wish to draw the Prime Minister's attention to what he regards as a burgeoning crisis. *No papers*

4. It is possible that he may also raise the subject of "the switch", on which he will be circulating a letter to colleagues shortly. *Meeting today*

5. *He may also talk generally about science*

20 December 1984

PRIME MINISTER

F
ceno
~~Await advice~~
from Dr Nicholson

THE EXPLOITATION OF RESEARCH COUNCIL FUNDED INVENTIONS

1. Following your announcement of the removal of BTG's monopoly right to the exploitation of Research Council funded inventions my Department has had extensive discussions with the Research Councils, other Departments concerned, the CVCP, and others (including Dr Nicholson) about the new arrangements. I am now in a position to make a more detailed policy statement to give effect to them; but thought that I should first make sure that you are content with the substance of what I propose.

2. A draft statement is enclosed. As I see it we have two main aims: to make researchers supported by Councils more aware of the importance of exploiting their findings wherever possible, and bring them closer to industry and commerce; and to encourage development of the ways in which exploitation happens in the private and in the public sectors, both directly by enterprises and through intermediaries such as venture capitalists.

3. I wondered if we should just have a free for all, allowing every researcher to do as he or she saw fit. Somewhat reluctantly, I think not - at least not yet. Public money is involved and there are statutory and other legal requirements to accommodate. Many researchers do not have the skills to pursue exploitation themselves; the incentive to develop such skills needs time and encouragement to grow. We must also ensure that as far as possible benefits from the commercial application of discoveries accrue to the UK not to foreign competitors.

4. Nevertheless our aim, so far as the researcher is concerned, must be for us to clarify and devolve responsibility

as fully as possible, and with it incentive. I believe the arrangements I propose will do this, and will allow for growth and development.

5. That is the picture too, I understand, so far as the interested enterprisers are concerned. I think that it is fair to say that, partly as a result of our own policies, partly as a result of Councils' efforts, the last few years have seen a growing awareness in industry and commerce of the benefits of collaborating with universities and Research Councils. And venture capitalists such as Prutec, Cogent and New Technology Enterprises are now increasingly approaching universities. I think that this is all to the good; I believe that the new arrangements will add momentum.

6. The more important part of my proposals are those concerning the universities. I see the Councils' invitation to them to say whether they wish to take responsibility for exploitation as a crucial step and one they should have time to take in a considered way. It will open up new markets for venture capital and other private sector initiatives. I intend to give it wide publicity. I hope that in due course all universities will respond positively. I cannot tell them how to run their internal affairs; but I would take every opportunity to stress that we are expecting minimal bureaucracy, and speedy competent mechanisms. We must see that the arrangements help, not hinder, the enthusiastic researcher with a good product or commercial idea to get it into UK industry or commerce.

7. There is room to do better too for Councils' in-house work. Again we must devolve responsibility and reduce central controls to the minimum, consonant with the principles of the FMI. I hope that it will prove possible to abolish delegated authority controls here; and my officials are talking to their opposite numbers in the Treasury. I also want to see more private sector money going to reinforce what we are doing for science; hence the importance I attach to Councils' retaining earnings from their in-house inventions.

8. I believe that their officials will be able to commend my proposals to Norman Tebbit and Peter Rees; and I hope that you will feel able to endorse them, thus enabling me to make an announcement as soon as possible after the recess, and the Councils to approach the universities. I judge that they should have up to three months to respond; and that the new arrangements could come into effect rapidly thereafter.

9. I am copying this minute and enclosure to Norman Tebbit and Peter Rees, and to Dr Nicholson and Sir Robert Armstrong.

19

KJ

19 December 1984 .

19 DEC 1984

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DRAFT

POLICY STATEMENT BY THE SECRETARY OF STATE FOR EDUCATION AND SCIENCE

THE EXPLOITATION OF RESEARCH COUNCIL FUNDED INVENTIONS

1. The Government wishes to encourage the fullest possible industrial and commercial application of UK scientific and technological discoveries, for the maximum benefit of the UK economy. This year we shall spend, through the Grants-in-Aid to the five Research Councils, some £530M on civil scientific research and as I informed the House on 12 November, we have decided to make an additional £11M available in 1985/86, over and above our previous plans, in recognition of the long-term importance of research for the country. Following the Prime Minister's announcement of the ending of the right of first refusal hitherto held by the British Technology Group (National Research Development Corporation) for the exploitation of research funded from the Science Budget through the Research Councils, my Department has had extensive discussions with the Councils and others concerned; and I am now able to announce the main features of the new arrangements.

Still
correct?

2. The Government's overall aims in the new arrangements are to increase the exploitation of research funded by the Councils, for the maximum benefit of the UK economy: to strengthen and improve exploitation arrangements, through freer competition between exploiting agencies in the public and private sectors and in other ways; and, therefore, to place responsibility, initiative and incentive for exploitation as fully as possible on the Councils, researchers and their institutions, consistent with their legal responsibilities.

We want researchers to be aware of the possibilities of their work, to see the benefits of exploitation both for their own establishments and more widely in the national interest, and to have access to arrangements for exploitation as simple and effective as practicable.

3. I am inviting each Council formally to define and promulgate its proposed policy and practice having regard to these overall aims; to take into account, where appropriate, any potential for exploitation in their decisions on funding research; and to amend their conditions

of grant and related arrangements so as to encourage this.

4. For the research they support in universities the Councils - who between them are currently funding some 6,900 research projects of total value of £360M - will, I understand, wish to transfer the rights and responsibilities for exploitation to the institution in receipt of grant, where the university wishes to accept them, and where the Councils are satisfied that adequate arrangements and procedures exist for identifying and pursuing potentially exploitable results. On behalf of these Councils and with their agreement, the Chairman of the SERC will shortly be writing to Vice-Chancellors to propose this transfer and invite them to state their University's wishes.

5. It will be open to universities to propose what arrangements best suit their circumstances. For example they may wish to negotiate terms for transfer of both the rights and responsibilities for exploitation to intermediaries such as private sector organisations or to the BTG (NRDC); or they may wish to retain the rights themselves. In this latter case they may enter into direct arrangements with industrial or commercial companies for the exploitation of individual discoveries, seeking such professional or other services as they need; or conclude agreements with private sector intermediaries to undertake this on their behalf. An institution may wish to make different arrangements for different types of discoveries.

6. Universities' proposals will be considered by the SERC in consultation with the other Councils, the CVCP, the UGC and with my Department and the Department of Trade and Industry. Councils will seek to satisfy themselves as to the likely efficacy of the arrangements. When arrangements are agreed and in place Councils would thereafter regard transfer as effected; and would wish to receive a brief annual report from each institution on the working of the arrangements in respect of their grants and contracts, including information on income earned. The Councils would wish to review any major changes which a university wished to make in its agreed arrangements.

7. It would be for the university to negotiate exploitation terms. Universities will be able to retain receipts in full without loss of general or specific grants. I hope that they will see fit to use

them to strengthen and improve their research capability and its further exploitation. I think it would be appropriate for the Councils, in conjunction with other interested bodies, to review the arrangements when sufficient experience has been gained of their operation, perhaps after three years.

8. I understand that Councils intend that the arrangements for the use of their new freedom and responsibility for the exploitation of inventions originating in their own Units and Institutes should provide for the maximum involvement of researchers and their establishments having regard to Councils' financial and legal responsibilities and the efficient use of a Council's experience and expertise. The present delegated authority controls governing their involvement in commercial enterprises will be phased out as soon as each Council is ready to take on its responsibilities fully. They will be able to retain earnings from exploitation of their in-house inventions without loss of Grant-in-Aid. When sufficient experience has been gained the Department will wish to review the workings of the new arrangements with the Councils.

9. The intention of these changes is to benefit the UK; and it is important that the exploitation of our scientific and technological discoveries should as far as possible be done by UK companies. This aim will be borne in mind when considering proposals from universities for the new arrangements. There may be circumstances where a foreign company or a subsidiary of such a company is the best choice, whether as an intermediary or for the negotiated transfer of rights. Where a university is considering using such a company or subsidiary for all of their discoveries, or all discoveries in a particular discipline or field, I should be grateful if they would consult the Department of Trade and Industry at an early stage. The Department of Trade and Industry will also be ready to advise in particular cases and I would hope that universities will consult them freely. The Annual Reports which universities make should record any agreement for exploitation made with an overseas company or a subsidiary.

10. I recognise that there is a nice balance to be struck between the free flow of information on which the health of science so critically depends and the need to protect new inventions if they are to be fully exploited to the benefit of the UK. A balance is also

required between the freedom and motivation of the researcher to pursue exploitation, the efficient use of negotiating and other commercial skills to secure the best terms, and the legal responsibilities of Councils and universities. I am confident that the scientific community, through consultation between the Councils and the universities, will be able to work out agreed arrangements that will meet the Government's aims.

11. It is my intention that the new arrangements should take effect as soon as possible. I will make a further announcement when the Councils' consultations are complete.



CF
Pre keep handy.
OMB
11/2

70 WHITEHALL, LONDON SW1A 2AS

01-233 8319

From the Secretary of the Cabinet and Head of the Home Civil Service

Sir Robert Armstrong GCB CVO

Ref. A084/3276

11 December 1984

Dear David,

Annual Review of Government Funded R & D 1984

Cmd 8591, the Government's response to the 1981 House of Lords Select Committee on Science and Technology report "Science and Government", announced the Annual Review of Research and Development. The factual material assembled for the first such review was published in January 1984 as the "Annual Review of Government Funded R & D 1983". The material assembled for the --- second review is being published on 11 December. I attach a copy.

I am sending copies of this letter and the Review to Private Secretaries to other members of the Cabinet.

*Yours
Ri*

(R P Hatfield)
Private Secretary

D M Barclay Esq

File

280

MISS ROCHE

C-1

We had a word yesterday about the proposed announcement on Monday 10 December about the 1984 Annual Review of R and D.

The Prime Minister has approved the attached text. Could you please arrange for the Question to be tabled, and answered on 10 December, keeping the Cabinet Office and the No. 10 Press Office informed.

MR. D. BARCLAY

6 December 1984

285



10 DOWNING STREET

From the Private Secretary

SIR ROBERT ARMSTRONG

ANNUAL REVIEW OF R AND D 1984

The Prime Minister was grateful for your minute of 4 December about the publication of the 1984 Annual Review of R and D.

The Prime Minister agrees that publication may be announced by means of a written Parliamentary Answer on Monday 10 December. She is content with the draft Question and Answer attached to your minute, subject to the deletion of the penultimate sentence (beginning "The results ...") from the first paragraph.

Our Parliamentary Questions Section will make the necessary arrangements, in consultation with the Cabinet Office.

MR. D. BARCLAY

6 December 1984

255



Prime Minister ⁽¹⁾

Agree attached Q and A,
for answer on Monday?

Ref. A084/3230

PRIME MINISTER

Annual Review of R and D 1984

See over page 2
Dubs
no 5/2

You gave your permission for the publication of the factual material which was assembled for the 1984 Review in response to my minute of 23 July (ref A084/2104). Printed copies of the book will be ready late next week. I propose that you should announce publication by means of an arranged PQ which would be down for Written Reply on Monday 10 December. I attach a draft. As you will see, it refers to publication the following day, Tuesday 11 December when copies will be placed in the Library of the House of Commons. There will be a small press conference in the early afternoon, and Dr Nicholson is addressing a meeting of the Association of Science Writers on the subject of the Review in the evening of the same day.

R

Approved by
ROBERT ARMSTRONG
and signed in his absence

4 December 1984

SCI + TERN
Budget PR



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CONFIDENTIAL

DRAFT INSPIRED WRITTEN PARLIAMENTARY QUESTION TO THE PRIME MINISTER

[] To ask the Prime Minister whether the factual material assembled for the 1984 Annual Review of Government Funded Research and Development (R & D) will be published, and if so when?

ANSWER

The Annual Review of Government Funded R & D, which was announced in the Government's response (Cmnd 8591) to a House of Lords Select Committee report "Science and Government", has now completed its second cycle. As envisaged in the original White Paper, Departments submitted their R & D plans to the Cabinet Office in the early part of this year: they were reviewed under the guidance of the Interdepartmental Committee of Chief Scientists. The material was also considered by the Advisory Council on Applied Research and Development (ACARD) which provided its independent advice to the Government.

Several aspects of the 1984 Review are subject to further study.

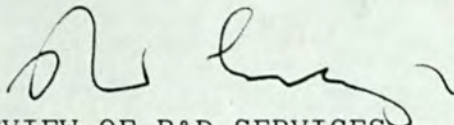
The Government wishes to encourage informed debate on this important topic and is therefore again publishing the factual material assembled for the 1984 Review, together with a short commentary section. It will be published by Her Majesty's Stationery Office tomorrow, and I am arranging to have copies placed in the Library of the House of Commons.

Check and read of
H.C.'s statements today. *[Signature]*
It may be better to leave out
that sentence

01 211 6402

The Rt Hon The Earl of Gowrie
Chancellor of the Duchy of Lancaster
Management & Personnel Office
Great George Street
LONDON
SW1P 3AL

mspm
ms
26/11
28 November 1984

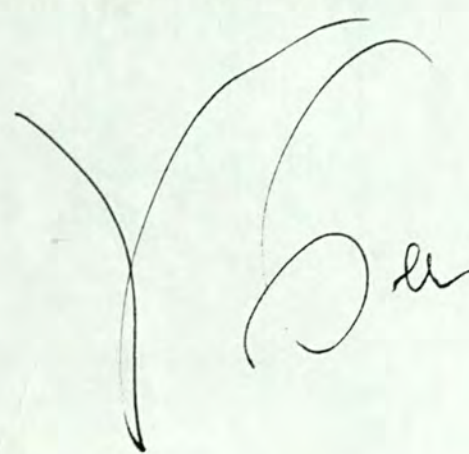
mspm
ms
26/11

REVIEW OF R&D SERVICES

was request if required -
Thank you for sending me a copy of your letter to Keith Joseph of 12 November, containing the progress report on the review of support services in R&D. The results so far are impressive and I have passed the report to my Chief Scientist to study in more detail.

As I am sure you know, this Department does not have any R&D establishments directly under its control, but we are concerned with a great deal of research. Some is done by the public sector energy industries and I am required by statute to approve that. Some is carried out by the UKAEA and my Department is their major customer. The remainder we contract out to a range of public and private sector organisations.

I have recently appointed an independent Chief Scientific Adviser and I have strengthened my Advisory Council on Research and Development (ACORD) and broadened its remit to cover all the R&D for which I am responsible. With their help I shall review all public sector energy R&D every year. Also, this year I commissioned a detailed and very wide ranging review of the AEA which is currently being dealt with.

I am copying this letter to the members of the Cabinet, Sir Robert Armstrong and Sir Robin Ibbs.


PETER WALKER

28 NOV 1984



JVRAMX

cc Press



10 DOWNING STREET

From the Private Secretary

DR. NICHOLSON

BBC 2 HORIZON PROGRAMME ON SCIENCE

Thank you for your minute of 16 November, which the Prime Minister saw over the weekend.

I rather think that the Prime Minister did not have time to watch the Horizon programme but, if an opportunity arises to see the video, I will let you know. Meanwhile, Mrs. Thatcher has asked if you would kindly work up in a little more detail your idea that the Government might seek to put forward a more positive view of British science and technology.

I am sending a copy of this minute, and of yours, to Mr. Ingham, since I am sure that the No. 10 Press Office will want to be involved.

(DAVID BARCLAY)
19 November 1984

JKRAMX

ECU

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Prime Minister

You may like to look at the programme if you have time. I will ask Dr Nicholson for

MR DAVID BARCLAY, No 10

W.0864

BBC 2 HORIZON PROGRAMME ON SCIENCE

16 November 1984

has pleased me

more detailed ideas on X, if you agree.

There was a BBC 2 Horizon programme on Science broadcast last Monday which is being repeated at 1.50 pm this Sunday. The programme deals with many of the current issues of funding of science in this country eg "picking winners", the CERN review, decline of quality through under-funding, defence R&D in, by BBC standards, a balanced way.

Sub 16/11

mt

The comment is fairly typical of the negative and carping material which is appearing in magazines like 'Nature' and 'New Scientist' and in the national press.

The Prime Minister might find it useful to watch the programme this weekend if possible - alternatively I have a video. She may feel that it would be timely to put forward a more positive view on British science and technology. For example something might be arranged at the time of her visit to Oxford on 7 December for Mr Robert Jackson's All Souls Seminar.

I would be happy to make detailed suggestions in consultation with the Press Office.

X1

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RBN

ROBIN B NICHOLSON
Chief Scientific Adviser

186 NOV 15. 4.



CONFIDENTIAL



DEPARTMENT OF TRANSPORT
2 MARSHAM STREET LONDON SW1P 3EB

01-212 3434

David Barclay Esq
Private Secretary
10 Downing Street
LONDON SW1

1 October 1984

NBPM

JR

1/10-

Dear David

ANNUAL REVIEW OF GOVERNMENT FUNDED RESEARCH AND DEVELOPMENT

Thank you for copying me your letter of 6 August to John Gieve.

The Secretary of State has asked me to say that he welcomes the Annual Review and the actions put in hand by the Prime Minister relating to the Review and ACARD comments. His Chief Scientific Adviser and colleagues will take an active part in developing proposals for action through the Sub-Committee of Chief Scientists.

I am sending a copy of this to Richard Hatfield.

yours sincerely

Henry Derwent

H C S DERWENT
Private Secretary

CONFIDENTIAL

SCIENCE + TECH: Budget Pt 2

DEPARTMENT OF TRANSPORT
MANSFIELD STREET LONDON W1P 3SE



David Barclay Esq
Private Secretary
10 Downing Street
London SW1A 2AA

London SW1A

1 OCT 1984

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10
9
8

COMMUNICATIONS
The Secretary of State for Transport
Mansfield Street
London W1P 3SE
Dear Sir,
I am writing to you in connection with the
provision of a copy of this to Robert Smith.

Yours faithfully,
[Signature]



Foreign and Commonwealth Office

London SW1A 2AH

24 September 1984

JMB
24/9

Dear David,

Annual Review of Government Funded Research and Development

The Foreign Secretary was grateful to have his attention drawn to the latest Annual Review on Research and Development and the views of the Advisory Council for Applied Research and Development (ACARD) thereon (your letter of 6 August to John Gieve at the Treasury). He continues to be concerned over the high proportion of R&D expenditure devoted to defence. The fact that we spend less on civil R&D than our main competitors, both absolutely and as a proportion of total R&D, inevitably affects our ability to participate in useful international collaboration and our standing as a technologically advanced nation.

Sir Geoffrey notes that the Prime Minister has asked Sir Robert Armstrong to advise how this issue might best be examined interdepartmentally, and hopes that because of the international repercussions the FCO can be represented on any interdepartmental machinery that is set up for the purpose. He would also be glad of the opportunity to comment at a later date on any recommendations that may be made.

I am sending copies of this letter to the Private Secretaries of members of the Cabinet and to Richard Hatfield.

Yours Sincerely,
Colin Budd

(C R Budd)
Private Secretary

D Barclay Esq
10 Downing Street

CONFIDENTIAL



MINISTRY OF DEFENCE
MAIN BUILDING WHITEHALL LONDON SW1
Telephone 01-~~830X7822~~ 218 2111/3

MO 26/1

10th September 1984

amb
10/9

Dear David,

ANNUAL REVIEW OF GOVERNMENT FUNDED RESEARCH AND DEVELOPMENT

My Secretary of State has seen your letter of 6th August to John Gieve on this subject.

Mr Heseltine has noted that the Prime Minister has asked Sir Robert Armstrong to advise her on how the issues raised by ACARD in respect of defence research and development expenditure should be examined inter-departmentally; he will expect any such examination to include a critical examination of the economic arguments put forward in support of ACARD's comments in this area. Officials here will of course be ready to play a full part in the further work.

I am sending a copy of this letter to Richard Hatfield (Cabinet Office).

Yours etc,
Denis

(D BRENNAN)

D Barclay Esq

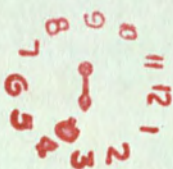
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Science & Tech Budget

MINISTRY OF DEFENCE
MAIN BUILDING WITTHALF LONDON SW1

Telephone 01-930 9833

PT2



9 JUN 1984

WITTHALF
LONDON

CONFIDENTIAL



2 MARSHAM STREET
LONDON SW1P 3EB
01-212 3434

My ref:

Your ref:

JMB
3/9

3 September 1984

Dear David

ANNUAL REVIEW OF GOVERNMENT FUNDED RESEARCH AND DEVELOPMENT

Thank you for copying to me your letter of 6 August to John Gieve.

The Secretary of State has asked me to say that he welcomes the Annual Review and the actions put in hand by the Prime Minister relating to the Review and ACARD comments. Officials in DOE are investigating the potential for encouraging the construction and allied product industries to become more involved with R&D and to stimulate innovation. The Secretary of State will be pleased for his Chief Scientist and colleagues to take an active part in developing proposals for action through the Sub-Committee of Chief Scientists.

Yours ever

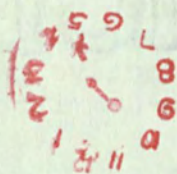
Andrew

A C ALLBERRY
Private Secretary

David Barclay Esq

SCI + TECH : Budget

AZ



SEP 3 1988



With DB?

CABINET OFFICE

This is the minute referred to in paragraph 13 of my minute to the Prime Minister of July 27.

With the compliments of

ROBIN B NICHOLSON

Chief Scientific Adviser

CF: Please pa. This relates to the 2nd Annual Review of R&D.

Emb

16/8

70 Whitehall, London SW1A 2AS
Telephone 01 233 7089

W.0577

15 August 1984

MR BAILEY, H M TREASURY

R & D EXPENDITURE BY DEPARTMENTS

1. Several times this year, I have promised the Chief Secretary a set of personal comments on Departmental R & D programmes. These are given below and are intended as an addition to the ACARD comments on the Annual Review, a copy of which you have seen.

2. The comments are personal impressions based on the close scrutiny of Departmental R & D objectives and expenditure plans which my Secretariat have made while preparing the 1983 and 1984 Annual Reviews. But I cannot substantiate the detail of some of my comments so I have tried to make them in the form of questions which I believe Departments could reasonably be expected to answer. For the same reason, I am sure you will understand if I ask for copying of this minute within Treasury to be limited and for the source of the questions to be protected in bilaterals with Departments.

General Comments

3. Generally the overall picture is one of rigidity and lack of change to meet changing circumstances. I believe that the form of Treasury/Department interactions (both during the PES round and in the course of business throughout the year) may be substantially responsible for this. It is easier for Departments to defend the status quo than to close an R & D programme which is no longer needed and reallocate the resources to a new high priority area. I would cite the almost total absence from this year's Report by the PES Committee of any bids for new R & D, and of any proposals to Treasury for offsetting savings on existing R & D as evidence of the increasingly defensive approach Departments have to R & D planning. Any private sector company which operated in this way would go out of business. With the Government responsible for half the nation's R & D and nearly half its economic activity, this is, or should be, a chilling thought. I think Treasury needs to adopt a stronger line against long running programmes and a more positive approach to Departments'

proposed use of freed resources to initiate new programmes, especially those offering potential for cost reduction and wealth generation in the future. Presently the main control mechanism used by Treasury seems to be an indiscriminate attack on all new programmes.

4. This year Departments were asked for improvements in the statements of objectives of their R & D programmes. They were asked particularly to describe their R & D objectives at a strategic level, in quantitative terms wherever possible, and in terms of the primary purposes listed in the Annex to this minute. While some improvements were noted, the general standard of the statements remains low. ACARD industrialists found it almost impossible to relate individual expenditure plans with components of the statements of objectives. This made it very difficult to analyse the value for money being achieved by Departments' programmes, and it called forth critical comments from the Council with which I agree. There seems to be a widespread approach to setting Departmental R & D objectives which runs along the following lines - "There are far more research proposals likely to be cost-effective than we can possibly afford to fund, therefore we will simply support the best of them. The R & D objectives of the Department as a whole are, therefore, simply the aggregate of the objectives of these individual programmes". In my view research programmes should be much more closely driven by Departments' strategic aims than this. My Secretariat will work with Departments on this problem during the preparation of the 1985 Review but you may wish to consider if other action is necessary.

5. Total UK expenditure on R & D (ie by industry, Government, public and private sector, etc) is in the 2-2.5% GDP bracket and is comparable with that of our major industrial competitors, US, Germany, France and Japan. UK Government expenditure on R & D is also probably reasonably comparable (although the direct expenditure by the Japanese government appears to be a smaller proportion of GDP and the substantial US government figure excludes most of the cost of R & D in universities). But UK total expenditure only gets into these brackets because of our enormous defence R & D expenditure. If that were cut, as I believe it should be, there is therefore a strong case for reallocating resources to other areas of R & D rather than taking the benefit of the cut in the form of reduced public expenditure. The areas which I believe are under-funded are long-term and strategic research where the adverse effects of under-funding take a long time to show through (hence their political

advantage). Our competitor countries are more far-sighted and our failure to follow them will have severe future economic consequences for the development of a strong science- and technology-led industrial economy.

6. In instituting the Annual Review, Cmnd 8591 stated that one of its purposes was to take an overview of the balance of Government funded R & D. Many areas of science and technology range across several Departments and a coordinated view of these must be taken, especially in the important area of strategic research, a subject which featured strongly in the House of Lords debate on 10 February. Further, R & D requires people and one Department can knowingly or unknowingly preempt too large a share of the resources available in scarce skills such as microelectronics. But some Departments still argue that they and they alone can determine the size and scope of their R & D programmes, and have not yet accepted the possibility that the Annual Review process may involve a re-allocation of R & D resources between Departments although this is clearly the intention of paragraphs 19-21 of Cmnd 8591. It will be for Departments themselves to consider and propose changes during the survey in the light of the results of the Review process. But if they are not receptive to suggestions for revising their plans, it may be necessary for the Prime Minister to exercise her "co-ordinating role" in science and technology (paragraph 27, Cmnd 8591) to aid the implementation of the Review's findings.

7. In the context of public expenditure, Cmnd 8591 clearly implied transfers of resources broadly within the current fraction of GDP spent on R & D and for the Review process to succeed, it must be accepted by Treasury that cuts in one area of R & D or in the resources of one Department may well need to be complemented by increases elsewhere.

8. On a presentational point, it is not at the moment possible to identify the R & D programmes of some Departments as separate PES lines. Ministers are not, therefore, able to gain an impression of total bids for R & D. Some quite major changes in R & D programmes that Departments may propose may not be apparent at all in the PES process. It might therefore be helpful to discuss, when the present PES round is completed, how the machinery of the PES and Annual Review processes might be better integrated for next year.

9. The Annex to this minute illustrates one way of looking at the balance of Government funded R & D. It shows that last year the Government spent nearly £4

billion on R & D. Fractionally more than half was spent supporting procurement programmes, the vast majority by the Ministry of Defence. Approximately 17 per cent was spent on each of the advance of science and the improvement of technology for industry. Most of the rest, 12 per cent of the total, was spent supporting Departmental policy making and policy implementation.

10. On current plans, MOD will spend a further £380 million cash in 1986/7. In so doing, its proportion of the total Government will spend on R & D will increase by 1%. By the same year, expenditure on advancement of science will have declined by 3% in real terms, and by nearly 1% of the Government total. R & D in support of Government policy making and implementation will decline by 4% in real terms.

Ministry of Agriculture, Fisheries and Food

11. ACARD has pointed out the large proportion of Government-funded R & D which is spent by MAFF and the regional Departments. In addition MAFF's R & D objectives seem to relate more to an era when increased self-sufficiency rather than surpluses was the problem, when 75% of the agricultural produce went straight to the consumer rather than 75% being processed into food as it is now, when private sector R & D and technical advice on fertilisers, pesticides, herbicides etc was a fraction of what it is now, and when the farming industry consisted of a myriad of small, unsophisticated farmers whose technical hands needed to be held by ADAS at considerable public expense.

12. MAFF can reasonably be asked how they can justify the continuing high level of expenditure in view of the radical changes in the agricultural industry. They could also be asked what steps they are taking to bring their R & D objectives into line with current and future trends in the industry. Since UK accession to the European Community, the farming industry has received massive EEC support under the Common Agricultural Policy. Yet the industry continues to enjoy the benefits of all the domestic public support systems such as R & D, advisory services and training schemes set up before accession to the EEC.

Ministry of Defence

13. ACARD has drawn attention to the high opportunity cost of pre-empting an

apparently ever-increasing fraction of the nation's R & D resources in defence technology, and to the extraordinarily high ratio of R & D expenditure to expenditure on defence products. I support their analysis. The trend of more widely spaced orders for fewer pieces of more expensive equipment with the gaps having to be increasingly filled by more R & D contracts "to keep development teams together" must stop eventually.

14. On the 'development' side of their expenditure, MOD could be asked how they decide on the proportion of total expenditure to be spent on development, what proportion of development contracts lead to equipment which is then purchased, what is the export performance of equipment whose development is funded in this way and what progress is being made in persuading industry to fund the development work itself through the pricing of its products. Incidentally, one would assume that progress on this last point would lead to a substantial reduction in the size of the Procurement Executive since MOD's relationship with its contractors would become closer to a normal commercial one.

15. On the 'research' side of their expenditure, MOD could be asked on the extent of the interaction of their basic and strategic research with DES funded research and on how they monitor the quality of their intramural work in comparison with industrial laboratories, Universities and Research Councils.

Department of Education and Science

16. The annex shows that expenditure on the advancement of science accounts for some £675 million of the 1983/84 total expenditure on R & D which is carried out mainly at Universities and Research Council institutes and establishments. Funding of advancement of science is planned to decline by 3% in real terms by 1986/87 and of the major funding agencies, only the Science and Engineering Research Council (SERC) is likely to maintain its expenditure. However, the effects of increasing international subscriptions, increasing superannuation costs and other factors mean that even the SERC is likely to be supporting less basic research in real terms by 1986/87.

17. The UGC leg of the dual support system contributes more than half of the science total. The general view, which I support, is that this estimate overstates the University input to science. ACARD commented last year on the

need to get a more accurate figure and this need remains. There is mounting evidence that the 1981 UGC cuts have hit research proportionately more than teaching and thus the squeeze on basic research is even greater than is suggested in paragraph 16.

18. The House of Lords debate on 10 February indicated widespread concern on the health of basic and strategic research which was acknowledged by the Lord President in his summing up. I also believe there is real damage being done to our University and Research Council research. Does this matter? It is true that the past excellence of this research seems to have had little influence on the economic performance of the country. But one does not solve that problem by reducing the excellence of basic research. At a time when the Government's policies have led to encouraging progress in the application of our scientific and technological skills to producing marketable goods and services, it would indeed be ironic if the same Government were to damage irreparably the very source of those skills and so inhibit the future development of a strong science- and technology-based industry. This is also an area where, in all countries, Governments are the main providers of financial support because of the long-term nature of the research and because of the link they see between the health of basic research and future economic prosperity in an increasingly technological environment. For all these reasons I support the DES bids for extra resources.

19. Of course there remains scope for extra resources for research to come from improved efficiency but the Research Councils in particular are moving quite rapidly and yet the rate of release of resources is too small to meet the problems I have outlined above. The real financial benefits from the current restructuring will not be felt until the post-PES period. DES can be asked if they are satisfied that UGC resources are being spent in truly competitive laboratories rather than spread around too thinly. They can also be asked whether the current structure of the Research Councils is still the right one when so many new areas of science such as biotechnology and remote sensing seem to be picked up by several different Research Councils who then have to form a 'directoriate' to co-ordinate their activities. The Dainton report (Cmnd 4814, 1971) had some persuasive arguments for a single 'National Research Council' which read even better 13 years later. Finally, the Research Councils' plans for funding capital equipment, especially large equipment, in the future are unclear and DES could be asked about this and the status of international cost-sharing on future capital projects.

Department of Energy

20. The Department of Energy won first prize from ACARD for the clarity of its R & D objectives and the ease with which these could be related to expenditure. Nevertheless ACARD queries the continuing very high expenditure on fast reactor research and I would broaden this query to nuclear energy research as a whole. The UKAEA has a unique pre-Rothschild status in which it both advises the Secretary of State on what research should be done and then does it. It is not clear whether hard questions have been asked on the balance between this research, R & D in the public utilities (where the Secretary of State also has responsibilities), non-nuclear research and the development of offshore technology.

21. The Department of Energy could be asked (as the House of Commons Select Committee has asked recently) whether they can justify the R & D balance between nuclear, public utilities and non-nuclear, whether they are satisfied with the quality, scope and size of R & D by the utilities and whether the current line of public and private sector R & D in offshore technology is going to leave us with a world competitive high technology offshore industry as North Sea oil declines.

Department of Environment

22. Long-term and strategic research on the environment is seen as a major responsibility by most Governments. The uncertainty of the technical background behind many recent policy decisions on subjects such as acid rain and disposal/storage of radioactive waste suggests that DOE has been failing in its responsibility to do adequate R & D to provide the technical back-up for policy-making in this area. DOE could be asked whether they are satisfied with the quality of their technical knowledge in the major environmental problem areas and, if not, what they propose to do about it.

23. DOE are also responsible for public sector research on building and construction. The technical quality of much building and construction in the UK seems to be appallingly low, eg high-rise flats, and the very large financial and social consequences of this are increasingly apparent. Responsibility for

this stage of affairs is presumably shared between DOE with its statutory duties for approval of methods and materials of construction and the private sector which traditionally spends a minuscule fraction of turnover on R & D. What plans do DOE have to improve the situation?

Department of Health and Social Security

24. Technology has an increasing role in the Health Service. It offers many opportunities for cost reductions and hence meeting the requirement of Cmd 9189 that "the Health Service needs to achieve continuing efficiency improvements". There must be a role for increasing R & D devoted to that end. Yet there is little sign that this is appreciated in DHSS other, perhaps, than in the area of Information Technology. It is not clear who, if anyone, is doing applied R & D on the scope for diagnostic aids to reduce hospital admissions and on the use of the new developments in clinical treatment to reduce the length of hospital stays. The expenditure by DHSS on R & D of some £25m seems small in comparison with the cost of the Health Service and the potential benefits. One problem is that some of this work may be funded by NHS area boards but is unidentified as R & D.

25. DHSS could be asked what they are doing to ensure that the full opportunities for cost reduction of the Health Service through application of new science and technology are being properly assessed and implemented. They could also be asked about the basis on which they decide the level of their R & D spend.

Home-Office

26. As in DHSS, the Home Office has substantial opportunities from new technology to reduce the cost and improve the quality of its services. But the administrative staff of the Department seems to have a low level of appreciation of what technology has to offer and their in-house R & D staff have used the security excuse to become notoriously inward-looking.

27. The Home Office could be asked how they bring science and technology into their policy-making decisions and so make use of the R & D they are paying for. They could also be asked about the extent of interaction of their own R & D with the world outside and how they assess the quality and value of their programmes.

Department of Trade and Industry

28. A significant proportion of DTI's substantial spend goes on R & D. In comparison with other countries I have the impression that relatively little is used to pay for well focussed programmes which are designed to assist industry to utilise science and technology in order to establish itself in developing world markets. Too much is spent on industries which are in terminal decline and thus limited resources are less available for R & D programmes. The fiefdoms of individual sponsor divisions in DTI are very well defended so that it is virtually impossible to find funds for new programmes of even modest size, viz the current discussions on UK participation in the ESA slice of the Manned Space Station programme.

29. ACARD found it hard to detect a strategy behind DTI's R & D programme. A plethora of small development projects are supported which seem to involve almost every type of technological advance and companies in almost every sector of industry. There seems to be little concentration on areas in which real market opportunities exist. 'Support for Innovation' is just a convenient box and does not seem to include an effective set of objectives against which existing and new projects can be assessed. In addition these projects take up an enormous amount of official time since they are carefully evaluated before a grant is given and are closely monitored thereafter. Undoubtedly a more focussed programme would require less people to administer it - hence perhaps its unattractiveness in some quarters of DTI.

30. DTI have a mixture of programmes. They could be asked to assess the relative benefits to industry from R & D project grants, from research programmes carried out at DTI research establishments, from demonstration projects and advisory services. There must be a strong argument in favour of DTI providing assistance with high risk long-term R & D (such as the long-term Alvey programme) and providing awareness and advisory services to industry, but for industry to undertake its own investment in new technology for improved products and processes. From a wider viewpoint, DTI should also be monitoring the relative effectiveness of regional aid and of selective financial assistance (such as Support for Innovation) in creating a healthy, wealth-creating industrial sector. The balance between aid for manufacturing

industry and for service industries could also be addressed against a knowledge of their likely future contributions to the UK economy.

Conclusion

31. Following the PES bilaterals, the Chief Secretary may well wish to consider whether and how both the general and specific comments in this minute might be further examined. I would be happy to advise.

32. I am copying this minute to Sir Robert Armstrong and to David Barclay.

RBW

ROBIN B NICHOLSON
Chief Scientific Adviser

Total Government Expenditure on R & D by Primary Purpose,
£million cash

	1983/84 Estimated Outturn	1986/87 Plan Cmnd 9143(1) (change in real terms from 1983/84)
Advancement of Science	675	740 (- 3%)
Support for Policy Making	485	525 (- 4%)
Improvement of Technology	655	810 (+ 9%)
Support for Procurement Decisions	2005	2360 (+ 4%)
Support for Statutory Duties	65	75 (- 2%)
Support for Other Activities	65	75 (- 1%)
TOTAL	3950	4605 (+ 3%)

These figures are consistent with the Government's expenditure plans to be found in Cmnd 9143: the details in this table are not to be found in that White Paper.

16 AUG 1984

File
original returned
to Dr. N:

W.0567

14 August 1984

MR DAVID BARCLAY, NO 10

DB/97

MAINTAINING THE STRENGTH OF THE SCIENCE BASE

I am a little puzzled by Richard Mottram's letter of 9 August to you since in the first part he appears to disregard the arguments in your letter of 30 July. I suppose we should be grateful that the Secretary of State for Defence "sees no objection" to my proceeding in the way I've been instructed to by the Prime Minister, but I'm inclined to disregard his re-interpretation of the brief and to work from your letter of 30 July. Do you agree?

I am copying this letter to Richard Hatfield.

RBN

ROBIN B NICHOLSON

Dr Nicholson

I think the (red) letter is more "for the record" than for any other purpose.

My letter conceded that ^{there} were "advantages and disadvantages." It seems to me that the essence of your task, with Prof Norman and Sir David Phillips, is to weigh ^{identity and} these. In order to do so, you must surely postulate a change? I do not think we yet have a decision that this should be such a change.

DB/97



DEPARTMENT OF TRADE AND INDUSTRY
1-19 VICTORIA STREET
LONDON SW1H 0ET

TELEPHONE DIRECT LINE 01-215 5422
SWITCHBOARD 01-215 7877

JF7182

PSecretary of State for Trade and Industry

10 August 1984

John Gieve Esq
Private Secretary to the
Chief Secretary to the Treasury
HM Treasury
Treasury Chambers
Parliament Street
LONDON
SW1P 3AT

Ngem

W

Dear John,

ACARD REPORT : NEW OPPORTUNITIES IN MANUFACTURING

Following your letter of 2 August, DTI officials have discussed with Treasury the points on which you had reservations in the draft ACARD response. I understand that with some very minor redrafting they were able to agree a mutually acceptable text.

2 Unless we hear to the contrary from other Departments by 16 August, we propose to proceed to reply to ACARD using the revised text. You will have seen from David Barclay's letter of 6 August that the Prime Minister is in favour of early publication of our response.

3 I am copying this letter to the Private Secretary to the Prime Minister, the Secretaries of State for Education and Science, Defence, Employment and to Sir Robert Armstrong.

Yours ever,

Ruth

RUTH THOMPSON
Private Secretary

Science + Teen Budget

pt 2





MINISTRY OF DEFENCE
MAIN BUILDING WHITEHALL LONDON SW1

Telephone 01-~~8307822~~ 218 2111/3

MO 2/4/2

9th August 1984

Dear David,

MAINTAINING THE STRENGTH OF THE SCIENCE BASE

Thank you for your letter of 30th July. The Defence Secretary has seen this and has commented that, as he has made clear already, he, for his part, sees no advantage in transferring £20M a year from the Defence Budget to the Science Vote. Such a step would cut the Ministry of Defence's intramural basic research programme at the roots and remove the foundation for applied research. The Defence Secretary can see no way in which this loss could be compensated by greater activity on the civil side. Such a proposal moreover, which presumably implies a PES transfer, would be difficult to explain to the Government's supporters; the House of Commons Defence Committee's forthcoming inquiry into the implications of ending 3% annual real growth in the Defence Budget is relevant here.

While therefore the Defence Secretary sees no objection to Dr Nicholson, Professor Norman and the Chairman of the ABRC examining the proposition in more detail, he believes that they should begin by examining objectively the arguments for and against the change proposed, with no presumption that the change is itself desirable and the problem is simply one of devising the best means.

I am copying this letter to the recipients of yours.

Yours etc,

Richard Mottram

(R C MOTTRAM)

David Barclay Esq

Su+Tax
Budget per

MINISTRY OF DEFENCE
MAIN BUILDING WHITEHALL LONDON SW1
Telephone 01-930-7033



CONFIDENTIAL
SECRET
FOR EYES ONLY



W.0538

7 August 1984

MR DAVID BARCLAY, NO 10

*DMB
2/8*

ANNUAL REVIEW OF GOVERNMENT-FUNDED RESEARCH AND DEVELOPMENT

with DB?

I regret that there is a small but significant error in my minute of 27 July to the Prime Minister. Paragraph 12, line 8, should read: "At the moment total funding of R&D runs at ...". (In most countries Government funding is about half this).

This error in no way affects the argument in paragraph 12 but I thought I should point it out to you!

I am copying this minute to Richard Hatfield.

RBN

ROBIN B NICHOLSON

SCIENCE & TECH : Science Budget

Sept 83



12-11-83
HOUSE OF COMMONS

- 7 AUG 1983

CONFIDENTIAL



10 DOWNING STREET

From the Private Secretary

Sir Robert Armstrong

Annual Review of Government-funded Research and Development

The Prime Minister was grateful for your minute of 23 July advising on the second Annual Review of Government Research and Development. She has also noted the comments made by ACARD, and the advice of Dr. Nicholson in his minute of 27 July.

The Prime Minister agrees that copies of the Review, and of ACARD's comments should now be sent to Departments, and I shall be writing accordingly to Private Secretary colleagues in the terms of the draft attached to your minute. The Prime Minister also agrees that the Review should be published in the autumn, subject to the deletion of classified information relating to future defence expenditures.

As regards machinery for further consideration of the issues raised by ACARD, the Prime Minister would be content for you now to consult interested Departments over the terms of reference for an interdepartmental examination. She agrees that the group should be under Cabinet Office chairmanship, and that it should aim to start work after current PES discussions are complete.

As regards the work of the interdepartmental group, the Prime Minister agrees that it should focus mainly on the economic impact of current defence R & D expenditures. She would be grateful if it could consider specifically the proposition put forward in paragraph 6 of Dr. Nicholson's minute, that there is a case for examining the consequences of a reduction of MOD expenditure on R & D to roughly half its present value over a period of 5 years.

The Prime Minister has noted that the remaining issues raised by ACARD can be considered by the Sub-Committee of Chief Scientists.

I am copying this minute to Dr. Nicholson.

David Barclay

6 August, 1984.

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Secure Budget-

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10 DOWNING STREET

From the Private Secretary

Dr. Nicholson

I enclose a copy of a minute to Sir Robert Armstrong conveying the Prime Minister's response to the papers submitted last week on the Annual Review of Government-funded R & D.

There is just one point to add. This is that the Prime Minister agreed that you should now make available your analysis to the Chief Secretary, for use at his discretion in the PES Round, as proposed in paragraph 13 of your minute.

D13

6 August, 1984.

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FILE

JK

10 DOWNING STREET

From the Private Secretary

6 August 1984

Dear John,

ANNUAL REVIEW OF GOVERNMENT FUNDED RESEARCH AND DEVELOPMENT

The Prime Minister has received the report from the second of the Annual Reviews of R and D announced in Cmnd 8591 (Government observations on the report "Science and Government" from the House of Lords Select Committee on Science and Technology) together with the views of the Advisory Council for Applied Research and Development (ACARD) on the expenditures covered in the Review.

The Prime Minister has asked that the Review and ACARD's views (copies attached) should be drawn to the attention of members of the Cabinet, and she has agreed to publication of the Review with the deletion of classified information relating to defence expenditures.

The Prime Minister has noted that ACARD's major comments relate first to expenditures on defence R and D, secondly to the balance between the Government's support for R and D for agriculture, fisheries and food and for manufacturing, and thirdly, within manufacturing, to the distribution of support among different industrial sectors. She further notes that ACARD will themselves be considering the last aspect in more detail over coming months.

The Prime Minister has asked Sir Robert Armstrong to advise her on how the issues raised by ACARD in respect of defence R and D expenditures might best be examined inter-departmentally and to invite the Sub-Committee of Chief Scientists to consider the other comments made by ACARD.

I am sending a copy of this letter and the attachments to the Private Secretaries of members of the Cabinet and (without attachments) to Richard Hatfield.

Yours ever,
David

(DAVID BARCLAY)

John Gieve, Esq.,
HM Treasury.

CONFIDENTIAL

PRIME MINISTER1984 REVIEW OF RESEARCH

GR
 Pre type letter
 at flag D
 and return and ask
 Cabinet Office and
 for the enclosures. 6/8

W/E Box

The 1984 Annual Review of Government-Funded Research and Development is now complete. I attach comments on it from ACARD (Flag A), Sir Robert Armstrong (Flag B), and Dr. Nicholson (Flag C).

There are three major themes running through the analysis:

- (i) expenditure on Defence R & D is disproportionately high;
- (ii) research in support of manufacturing industry is disproportionately low, especially when compared with support for agriculture;
- (iii) the distribution of expenditure in support of manufacturing industry requires further examination.

Robin Nicholson concludes that Government-funded R & D is substantially out of balance: over-committed on defence, agriculture, and nuclear energy; and under-committed on basic and strategic research, especially in manufacturing.

The question is how best to take forward the Government's consideration of these issues. You are invited to agree that:

- (i) I should send copies of the Review, together with ACARD's comments, to Departments, using the draft letter at Flag D;
- (ii) the Review should be published in the autumn, subject to the deletion of classified information relating to future defence expenditure;

- (iii) Dr. Nicholson should pass his analysis to the Chief Secretary, for use at his discretion during the coming PES Round;
- (iv) Sir Robert Armstrong should consult interested Departments (mainly Ministry of Defence, HM Treasury, and Department of Trade and Industry) with a view to establishing an interdepartmental group, to look mainly at the economic impact of current defence R & D expenditure;
- (v) this group should be under Cabinet Office chairmanship, and should start work after the current PES discussions are complete;
- (vi) the group should consider in particular the consequences of a reduction of MOD research expenditure to roughly half of its present value over five years, with the resources being transferred to other research areas (see paragraph 6 of Dr. Nicholson's minute).
- (vii) the other comments made by ACARD should be considered by the ^{Sub-}~~special~~ committee of Chief Scientists.

I have some doubts about recommendation (iii) above, because of the danger that the Treasury would merely seize on all the points where expenditure should be reduced and ignore those where Dr. Nicholson sees a good case for an increase. But Dr. Nicholson judges that the exercise would on balance be worth while.

Content with recommendations (i) to (vii)?

Yes not

DMB

2 August 1984

PART 1 ends:-

DB to MOD

30.7.84

PART 2 begins:-

DB to Pm

2.8.84

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