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Versailles Economic Summit: Working Group a Technology

INDUSTRIAL POLICY

June 1982

PREM 19/1067

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2

Prime Minister

MLS 20/4

Treasury Chambers, Parliament Street, SW1P 3AG

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

18 April 1983

Dear Secretary of State

SERC INTERNATIONAL SUBSCRIPTIONS

In your letter of 15 April to Geoffrey Howe, who is at a Council of Ministers in Luxembourg today, you asked for a reply before the SERC meeting tomorrow.

The SERC clearly faces difficult options in its efforts to meet the potential shortfall on its international subscriptions sub-head. The choices will have been eased by the recent improvement in sterling which has, as I understand it, reduced the shortfall to less than £4 million. But even so, I can see they remain painful.

You are best placed to judge the seriousness of the implications of the cuts. But in my view the answer is not to give the SERC a commitment that any money which you or they cannot find will be provided from the Reserve. Exchange rate fluctuations are not different in kind from any other price increase, and agreeing to a bid from SERC now would open the floodgates to bids from other parts of the public sector, all equally hard-pressed.

Rather, I believe that SERC should be urged to look again at the other 98 per cent of their budget. I would also urge you to look again for offsetting savings in the other Research Councils. The current review of R and D Support Services might provide at least one source of useful savings either in SERC or more generally. But in any case, I have difficulty in accepting that a sum of money amounting to less than one per cent of the total Science budget cannot be found without serious damage at this stage in the financial year.

You also asked for a report by officials on the general problem of international subscriptions. I know that our officials have already discussed this, but if you now see some potential means

of alleviating the problem which is consistent with the discipline of cash limits and would not create difficult precedents, by all means let us ask them to discuss it further.

I am copying this letter to the Prime Minister, Francis Pym, Patrick Jenkin, Robert Armstrong and Robin Nicholson.

Yours sincerely

JSt. Greive

for LEON BRITTAN

[Approved by the Chief Secretary]

IND POL: Versailles Summit: Working Group on Technology
June 1982

DEPARTMENT OF EDUCATION AND SCIENCE

ELIZABETH HOUSE, YORK ROAD, LONDON SE1 7PH

TELEPHONE 01-928 9222

FROM THE SECRETARY OF STATE

15 April 1983

Dear Geoffrey,

SCIENCE AND ENGINEERING RESEARCH COUNCIL (SERC): INTERNATIONAL SUBSCRIPTIONS

1. Because of movements in the exchange rate since the Estimates were drawn up the SERC are faced with having to find several £m extra in 1983-84 to meet their unavoidable commitments to international scientific collaboration - notably to CERN, ESA, the Institut Laue-Langevin, and to NATO. The only practicable way to do this is to cut uncommitted research grants to universities, postgraduate studentships (again mainly tenable at universities), and work at SERC establishments (which provide services and underpinning for university research). Because such cuts will do disproportionate damage and occasion great concern in the science community and more widely, I am writing to seek your approval to my giving SERC an undertaking that will, for now, moderate the impact on university research and give us all a little time to find ways of adjusting to this and related problems in the longer term. Your officials are well briefed about the problem from discussion with DES and SERC, and have put the matter to Leon; it is because he has felt unable to help - and because of the likely public outcry if we do nothing - that I now raise the matter with you.

2. As of 7 April (the date when Council papers were completed for their meeting on 19 April) SERC would have to make savings of £5.3m this year. On 19 April they must take the necessary decisions and implement them straightaway thereafter. Because of the pattern of uncommitted money, the cuts will probably fall something like this

/(i) New research

The Rt Hon Sir Geoffrey Howe QC MP
Chancellor of the Exchequer
Treasury
Parliament Street
LONDON SW1P 3AG

(i) New research grants - £2m

(ii) New studentships - £1.3m

(iii) SERC establishments - £2m

Such cuts would reduce IT research for the Alvey programme (by about £1m) and would also fall heavily on other engineering and on "little" science (biology, chemistry, mathematics and "little" physics). The rejection rate for alpha-quality research grant applications from universities to the Science Board would be further increased from its present unprecedented level of about 30% (which I regard as unpalatably high) to about 45%. Each year about 3,300 new studentships need to be awarded to maintain the stock of trainee highly qualified manpower; that number would have to be cut by over 300 or some 10%. The cut in Establishments expenditure would fall on indirect support for university research programmes already approved and on capital work.

3. Thus the impact will be felt mainly by the universities - who are in the throes of adjusting to the UGC reductions; and will be found mainly at the expense of engineering and "little" science (much of "big" science money being tied up in international ventures). Our IT initiative cannot be exempted; and our "new blood" recruitment programme, although not directly jeopardised, would be affected via the reduction in new research grants. In public relations terms, the contrast with our policy of protecting the Science Vote, and with our "new blood" and IT initiatives (which have done much to hearten the science community) could hardly be more stark.

4. I have carefully considered whether savings of this order could be made elsewhere within the Science Vote, or on our other Vote expenditure. As to the former the effects would be essentially the same - cutting research grants and studentships. It would widen the discontent without reducing the damage to university research. In my other Vote expenditure there are no areas where I could now with confidence secure such savings, windfall or other. You will recall the recognition, in our recent discussions on the implications of the "ordinary residence" judgement, of the pressure under which I find myself in respect of the whole DES Budget.

5. I think it is in all our interests to give SERC sufficient assurance in time for their 19 April meeting as to enable them to avoid taking in full such damaging and contentious steps just now. My particular concern is to prevent the direct consequences for university research and postgraduate training. Clearly SERC should not wholly escape facing up to the consequences of their international commitments. What I propose is that I should tell them, before their 19 April meeting, that they should find the necessary savings to the fullest possible extent that can be achieved on their expenditure on indirect support for the universities; I judge this to be about £2m. But, if more than this is required - with adverse effects on research grants and studentships - then, except to the extent that any windfall savings came to light elsewhere in the SERC

Vote, they should be bailed out. For my part, I would undertake to redeploy for this purpose any windfall savings which might appear elsewhere in the Science Budget. Failing this I would look elsewhere in my Vote expenditure or, as a last resort, make a claim on the Contingency Reserve.

6. In making this proposal I of course recognise that on three occasions in the last ten years SERC have benefited, to the tune of something in excess of £10m, from favourable exchange movements; and that in the six years when the movement was adverse they were "rescued" either by being allowed to vire from their domestic subhead or by Supplementary Estimate. I must add that I understand that they have always been prepared to forgo exchange rate surpluses (retaining them only after consulting the Treasury and with the latter's agreement); that they have given up some £3m to the Treasury; and that, in the nature of things, the windfall benefits had to be used in the year in question and could not be applied to sustain any recurring expenditure or to hedge against unfavourable movements in the exchange rate.

7. What I propose would get us by for 1983-84. But other problems loom over international subscriptions in later years and it seems to me that your officials and mine, with those of the Councils affected, should prepare a report for further consideration by us all. I hope you would agree to this; and I should be grateful for your urgent approval to what I propose for 1983-84.

8. I am copying this letter to the Prime Minister, Francis Pym, Patrick Jenkin, Leon Brittan, Robert Armstrong and Robin Nicholson.

Yours,

Keith.

DES

MR TANNER

ADVICE	INFO
	✓

COPIES

MR STREET
MR BIRD
MISS GILBEY
MR RP NORTON

MR THOM

IND Pol : Versailles Summit : Working Gp on Technology
June 1982

Ref.A083/0902

MR FLESHER

c Dr Nicholson

Versailles Working Group Report on Technology, Growth and Technology

Thank you for your minute of 28 February. As requested, I now attach a draft Arranged Question and Answer for announcing the publication of the Versailles Working Group's report as a Command Paper.

2. It has been agreed that the report will be published simultaneously in the countries concerned at mid-day (our time) on Friday 25 March. The PQ will therefore need to be put down on Thursday 24 March.

R P Hatfield

23 March 1983

PT 22/3

W.0201

22 March 1983

MR HATFIELD

cc: Mr Flesher
Mr Stubbs
Mr Goodman
Dr Goldstone
Mr Stone

VERSAILLES WORKING GROUP ON TECHNOLOGY, GROWTH AND EMPLOYMENT

As requested in Mr Fletcher's note to you of 28 February, I attach a draft Arranged Question and Answer to cover the publication of this Report as a Command Paper presented to Parliament by the Prime Minister.

The proposed answer draws from:

(a) the wording of the Versailles Declaration;

(b) the Prime Minister's statement on her responsibilities for science;

(c) the summary of the Report as printed in the Command Paper;

(d) the Prime Minister's comments on the Report as per her letter to President Mitterrand.

The general idea I have followed is to try and indicate interest on the Prime Minister's part but without commitment. I realise I may have got some of the phraseology wrong in the part which deals with putting the Report before Parliament - no doubt you can correct this.

Finally we understand from the French that the meeting of Sherpas agreed that the Report would be released at 12.00 GMT on Friday, 25 March. Thus the PQ should be scheduled for Friday.

RBN

ROBIN B NICHOLSON

Q. To ask the Prime Minister what has been the outcome of the Working Group on Technology set up after the Economic Summit held last year in Versailles.

A. The Declaration of the Heads of State and Government and the Representatives of the European Communities at the Economic Summit held at Versailles in June 1982, referred to our decision to set up a working group of representatives of our governments to report to us on the opportunities and challenges presented by modern developments in science and technology.

The Working Group consisted of officials of our governments and the European Commission. It met for the first time on 20 August 1982 and completed its report, entitled "Technology, Growth and Employment" on 26 January 1983.

My interest in this report stems not only from its origin at the Economic Summit but also from my responsibility to the House for broad scientific and technological issues involving several Departments. I have decided to present the report to the House today as Command

This report considers the part played by technology in stimulating economic growth and employment. It mentions the history of technology in influencing social and industrial life, and identifies areas where significant benefits have arisen.

The report recognises that in spite of these benefits the application of technology may sometimes be resisted by the public. It considers this issue, and suggests further studies to improve understanding and thus derive the greatest advantage for society.

The report discusses the role of Governments and of the private and public sectors of industry in stimulating technological developments and economic growth. It points out that technology

is becoming increasingly pervasive in the world economy and in society and that there is a need for Governments to be aware of the influence of science and technology on their policies in both a national and international environment.

The report concludes that there is increasing scope for countries to collaborate in scientific and technological programmes, with mutual benefit to those taking part. It proposes a number of co-operative projects in various fields.

I believe that the report is a valuable commentary on the important role of science and technology in the major ecomomic and social issues which we face in the world today. It contains a number of interesting ideas and proposals which we shall want to examine more closely both nationally and in the appropriate international fora. I am looking forward to discussing the report at the next Economic Summit in Williamsburg, USA, in May this year.

Ind Pol
June '82
Working Group
on Technology

cc FCO JL

INDUSTRIAL POLICY

10 DOWNING STREET

From the Private Secretary

DR. NICHOLSON

VERSAILLES WORKING GROUP ON TECHNOLOGY, GROWTH AND EMPLOYMENT

Thank you for your minute of 28 February.

The Prime Minister has now signed a letter to President Mitterrand which deals with the question of publication of the Report. We shall despatch the letter, a copy of which is annexed to this minute.

As regards follow-up action on the Report, the Prime Minister has indicated that she does not wish a new group to be formed to prepare a report at each Summit (paragraph 3(c) of your minute). She has not specifically commented on options (a) and (b) in your paragraph 3.

I am copying this minute and its annex to Roger Bone in the Foreign and Commonwealth Office.

A. J. COLES

1 March 1983

RM

cc Master Ops.

cc CPRS FCO

PRIME MINISTER'S
PERSONAL MESSAGE
SERIAL No. T 24/83

10 DOWNING STREET

THE PRIME MINISTER

1 March 1983

Dear Mr. President,

I have received the Report of the Working Group set up after our meeting in Versailles to consider the subject "Technology, Growth and Employment". The Report is a valuable commentary on the important role of Science and Technology in the major economic and social issues which we face in the world today. It contains a number of interesting ideas and proposals which we shall want to follow up in the appropriate international fora and in our own countries.

I feel, and I am sure our colleagues will also take this view, that the quality and relevance of the Report fully justifies your initiative in raising this topic at Versailles and all the subsequent work which your Government has done to ensure the success of the Working Group. I believe that the Report should be published, and I hope we can make arrangements for simultaneous publication in all our countries. Naturally we shall want to discuss the Report at our meeting in Williamsburg and I believe that we should wait until this discussion before deciding on the most appropriate follow-up to the Report. I understand that the Working Group will itself be making some proposals to our Personal Representatives on this matter.

Yours sincerely

Margaret Thatcher

His Excellency Monsieur Francois Mitterrand

Prime Minister 3

You agreed to the publication of this report. A draft letter to President Mitterrand is attached for your consideration

W.0143

28 February 1983

TO: MR A J COLES, 10 Downing Street

FROM: DR NICHOLSON, Cabinet Office

cc: Mr Hatfield
Mr Sparrow

28/2

VERSAILLES WORKING GROUP ON TECHNOLOGY, GROWTH AND EMPLOYMENT

President Mitterrand's letter requests the Prime Minister's views on the publication of the Versailles Working Group's Report and on the follow-up to it.

2. On the question of publication, Sir Robert Armstrong's minute of 24 February gives the arguments for agreeing to the French desire to publish the Report as soon as possible.

3. On the question of follow-up, there are three options:-

(a) do nothing - the projects will in any case be progressed by the countries which have taken the lead in each case;

(b) arrange for the Personal Representatives to prepare a briefing for Heads of State and Government at each Summit;

(c) form a new group along the lines of the high level Energy Group to prepare a report for Heads of State and Government at each Summit.

No

The Heads of Delegations to the Working Group are meeting at the end of April to prepare a briefing for the meeting of the Personal Representatives in May who in turn will of course report to the Summit at the end of May. The Working Group is likely to recommend option (b) or option (c) and I see no need for the Prime Minister to take a view on this in her response to President Mitterrand.

4. I have drafted a response (attached) on the basis of the above

and I have assumed that the Prime Minister would wish to pay a modest tribute to President Mitterrand for his initiative in starting off this work.

5. I am drafting a written PQ and Answer for the Prime Minister, on the assumption that the nations will agree to publication of the Report and that it will be communicated to Parliament by the Prime Minister.

FILE

da

bc Ms. Stevens
Ms. Wallace

10 DOWNING STREET

From the Private Secretary

MR. HATFIELD
CABINET OFFICE

Versailles Working Group Report on Technology, Growth and Employment

The Prime Minister has now seen Sir Robert Armstrong's minute of 24 February enclosing the final Report of the Versailles Working Group on Technology, Growth and Employment. Mrs. Thatcher has agreed that, as proposed, the Report should be published as a Command Paper which she will present to Parliament on the same day as the Report is published in other countries. I assume that when a publication date is known you will provide a draft Arranged Question and Answer.

Timothy Flesher

28 February 1983

8-P

(1)

Ref: A083/0644

Prime Minister

Do you agree to present this Report soon to Parliament as a Command Paper?

Yes

A.J.C. 25/2

PRIME MINISTER

Versailles Working Group Report on Technology, Growth and Technology

The final Report of the Versailles Working Group has now been sent to you by President Mitterrand. It does not differ in content to the draft which was attached to Dr. Nicholson's minute of 14th January.

2. In his letter, President Mitterrand requests your views on the follow-up to the Report and also on its publication. The question of publication is urgent, because the French would like to publish the Report as soon as possible if all countries agree. In the meetings of the Group Dr. Nicholson has been arguing that the report should not be published until Heads of State or Government have received it and considered it at Williamsburg. None the less, my advice would be to agree to the early publication of the Report. Most other countries will do so; and, if we withhold agreement, the French will almost certainly leak it. There is a respectable reason for wanting early publication: to generate maximum interest in the Report and hence in the role of technology in the world today. The French Government - and no doubt President Mitterand himself - feel that, if the Report is published at the same time as the Williamsburg Summit, it will receive less attention. It results, of course, from a Mitterrand initiative.

3. If you agree, the Report should be published as a Command paper, presented by you to Parliament on the same day as publication of the Report in other countries. It is right for you to present it both because the Report is the result of an action decided on by Heads of State and Government at the Economic Summit and because you have responsibility for scientific and technological issues which straddle several Departments, as was restated in the White Paper giving the Government response to the House of Lords Select Committee on Science and Technology last year.

RtA

Robert Armstrong

24th February 1983

file Ind Pol BTC

T10C/83.

10 DOWNING STREET

From the Private Secretary

DR. ROBIN NICHOLSON
CABINET OFFICE

Versailles Working Group on
Technology, Growth and Employment

I have just received President Mitterrand's letter, dated 8 February, to the Prime Minister covering the final Report of the above Working Group. I attach a copy of the President's letter. You told me on the telephone that you already had a copy of the Report. I am therefore retaining the Prime Minister's copy here.

President Mitterrand seeks the Prime Minister's views on follow-up action and publication. I should be grateful for advice and a draft reply.

I am copying this minute and attachment to Richard Hatfield (Cabinet Office).

A. J. COLES

23 February 1983

6

010

W.0122

TO: MR A J COLES, No 10 cc: Mr Hatfield

FROM: R B NICHOLSON, Cabinet Office

VERSAILLES WORKING GROUP ON TECHNOLOGY, GROWTH AND EMPLOYMENT

As you know, HMSO is doing the printing of the Versailles Working Group Report as a Cmnd paper. Time is very short for the paper to be presented to Parliament by the Prime Minister before the date when the French will publish the Report. I have just heard this afternoon that the French have made some further alterations in the Report, so that the only definitive English version is the one which is on its way from President Mitterrand to the Prime Minister. I would therefore be grateful if you could let me have a copy of the Report as soon as it reaches No 10, so that I can pass it on to HMSO.

RBN.

22/2/83

Papers removed from file

Date 23/3/83

Versailles Report

with TK

W.0106

9 February 1983

TO: SIR ROBERT ARMSTRONG

cc: Mr Sparrow
Mr Gregson
Mr Hancock
Mr Coles

FROM: DR NICHOLSON

VERSAILLES WORKING GROUP ON TECHNOLOGY, GROWTH AND EMPLOYMENT

The Versailles Working Group on Technology, Growth and Employment duly completed its work on 26 January and formally presented a copy of its report to President Mitterrand. – in folder attached to file

2. Only the French text was available for presentation and there remained a fair amount of tidying up of both the French text and the English text, which has been carried out subsequently. I enclose a copy of the final English text. The French and English texts are the only official reports from the Working Group, but versions in other languages will be prepared by some of the other countries.

3. Now that the final texts have been prepared, President Mitterrand will shortly be communicating the report to Heads of State and Government, and the Prime Minister can expect to receive it from him in the course of the next few days. There will also be a covering letter which we hope to have a sight of before it is despatched, which will contain President Mitterrand's proposals for future treatment of the report.

4. It is likely that this letter will propose publication of the report on or about 2 March. The benefits of early publication in terms of avoidance of leaks and some public discussion of the report before Heads of State and Government meet in Williamsburg were felt by most nations to outweigh the disadvantages. In particular, it was felt that publication at the time of Williamsburg would result in the report being submerged by all the other material which will be released to the Press at that time. I have reserved the position for the United Kingdom but

my advice to the Prime Minister will be to agree with the majority view.

6. On the day that the report is published, it is likely that President Mitterrand will also send copies to Embassies of foreign countries in Paris, except for Soviet Bloc countries. However the Group agreed that the possible involvement of non-Summit countries in the projects and any other activities resulting from the report should be postponed until after Heads of State and Government have had an opportunity to discuss and comment on the report at Williamsburg.

7. There would seem to be some benefits in the United Kingdom distributing copies of the report on publication day to Commonwealth High Commissions in London. I am taking advice from the FCO on this matter.

8. As far as the mechanics of publication are concerned, the possibility of central printing and distribution being arranged by France was examined but turned out to be disadvantageous because of the charge which the French would have to make, and some doubt as to whether they could print the report in English. The simplest and cheapest alternative seems to be to have the report reproduced and published through the Department of Industry, and I am seeing their Publications Department later this week. We do not anticipate large-scale public interest but it will probably be necessary to prepare about 500 copies for distribution to Departments, the media and other enquirers.

9. As far as projects are concerned, some now appear by title only as anticipated, and this group includes the Renewable Energy Sources project developed by the Department of Energy. The other projects in which the United Kingdom is leader or co-leader were all retained in full form and the responsibility for pursuing these will now be passed to Departments, as will the responsibility for participating in projects led by other countries.

REPORT OF THE WORKING GROUP ON TECHNOLOGY, GROWTH, AND EMPLOYMENT

EXECUTIVE SUMMARY

General Introduction

> "Revitalization and growth of the world economy will depend not only on our own effort but also to a large extent upon cooperation among our countries and with other countries in the exploitation of scientific and technological development. We have to exploit the immense opportunities presented by the new technologies, particularly for creating new employment. We need to remove barriers to, and to promote, the development of and trade in new technologies both in the public sector and in the private sector. Our countries will need to train men and women in the new technologies, and to create the economic, social and cultural conditions which allow these technologies to develop and flourish. We have considered the report presented to us on these issues by the President of the French Republic. In this context we have decided to set up promptly a working group of representatives of our governments and of the European Community to develop, in close consultation with the appropriate international institutions, especially the OECD, proposals to give help to attain these objectives. This group will be asked to submit its report to us by 31 December 1982. The conclusion of the report and the resulting action will be considered at the next economic Summit to be held in 1983 in the United States of America."
>
> Declaration of the Seven Heads of State and Government and Representative of the European Communities
>
> Chateau of Versailles, June 4, 5, and 6, 1982

Consistent with this instruction, and at the initiative of the President of the French Republic, a Working Group of Representatives of Seven Heads of State and Government and the Representatives of the European Communities was set up to consider the opportunities, problems, and challenges presented by technology, with special regard to economic growth and employment. The Working Group met for the first time on August 20th, 1982.

Operating on the basis of consensus, the Working Group has produced a report which is essentially policy-oriented in nature and

is addressed to Heads of State and Government*. The report is selective: it concentrates on our own countries except where we state otherwise. It also concentrates on problems where science and technology offer potential solutions, but it does not pretend that science and technology provide a panacea.

The Group has completed its task, and has offered the following conclusions and recommendations:

-- Major advances in science and technology have caused profound changes in our way of life for more than two centuries. These developments continue today at an even greater pace.

-- Fundamental scientific research is one source of technological progress in industry and should be given special support by governments.

-- Technological innovation can play an important role in the increase of the level of employment and the improvement of labour conditions. Special training programmes are necessary to promote flexibility, mobility and adaptability of labour.

-- Our nations should make a better effort to prepare their citizens for living and participating in a society of an increasingly technical nature.

---

*In this report the word "government" is also taken to include the European Communities.

-- The fate of our scientific and technological innovations is largely a function of the willingness of the public to accept them. More attention to the problem of public acceptance of new technologies is needed.

-- Special attention should be paid to the rejuvenation of mature industries through the use of science and technology.

-- Sustained technical progress is best promoted through a balanced distribution of productivity gains between further investment and increased consumption.

-- An open and competitive trading system between autonomous but collaborating partners should be strengthened by harmonising and making more compatible our regulatory and testing systems. Care must be taken by governments to control the transfer of sensitive technologies of military significance to our countries.

-- Science and technology can be applied to many of the problems faced by the developing world. As developing countries create infrastructures in science and technology, our own countries should recognise the constructive role which they are able to play, mindful that it is the responsibility of the developing countries, as sovereign nations, to establish their own national policies and priorities.

-- The market introduction of new technologies is primarily the task of the industrial and commercial sectors. A competitive atmosphere is essential for this type of innovation, since it creates a continuous evolution of technological progress and, thereby, long-term economic growth. Governments should support fundamental science and long-term, high-risk research and development activities.

-- Governments need to generate and support the framework conditions for workable competition and provide incentives for innovation through the encouragement of invention and investment in innovation .

-- National policies in areas such as regulatory standards, tax, patent and trade all influence our ability to innovate and to reap the full benefits of innovation. The Group recognises and endorses the efforts of the OECD to resolve some of the problems faced in this area. We reaffirm our commitment to removing barriers to an open multilateral trading system, to strengthening the rules in this connection, and to promoting the development of trade in new technologies, particularly for creating new employment, and therefore, shall seek to intensify our contacts bilaterally and in all relevant fora. In this regard, the Group takes note that discussions of these items will be pursued in the GATT Council.

-- Science and technology are a source of national and international strength and can provide immense opportunities for revitalisation and growth of the world economy. They should therefore be given due consideration in all policy decisions for national development and international cooperation.

-- International cooperation in science and technology has demonstrated its value. Governments should continue to support cooperation, including the international scientific organisations.

-- With current economic difficulties and with national budgets subject to greater constraint, it makes even more sense to cooperate internationally, in particular, in long-term, high-risk research and development projects.

-- Already existing international cooperation in science and technology should be continued and, where appropriate, enlarged. An effective exchange of ideas and researchers must be strongly encouraged.

-- The cooperation begun under the auspices of this Working Group forms a solid base for future action and should continue in the relevant fora.

-- Finally, we recommend to our Heads of State and Government that, bearing in mind the role that science and technology can play in improving economic growth and employment, and in stimulating

culture and education, they take science and technology into account in their policy decisions and continue to include the subject on their agenda at future Summit meetings.

The Working Group has also reviewed a number of scientific and technological issues with a view towards determining where additional international collaboration could best contribute to increased understanding and improved social and economic conditions, not only for our own people, but for all the world.

In this process, we noted that a wide range of cooperation is already under way in important and wide spread areas such as:

- Conquest of space
- Renewable sources of energy
- Research on safety of light water reactors
- Deep ocean drilling

We appreciate this effort and encourage its development using existing multilateral and bilateral frameworks.

We also propose the following collaborative projects which are either new or incorporate significant re-focussing in order to achieve:

1. Stimulation of the conditions for growth by better management of energy resources by:

   - Photovoltaic Solar Energy
   - Controlled Thermonuclear Fusion
   - Photosynthesis
   - Fast Breeder Reactors

2. Better management of food resources by:

   - Food Technology
   - Aquaculture

3. Improvement of living conditions, employment, and protection of the environment, through:

   - Remote Sensing from Space
   - High Speed Trains
   - Housing and Urban Planning for Developing Countries
   - Advanced Robotics
   - Impact of New Technologies on Mature Industries
   - Biotechnology
   - Advanced Materials and Standards
   - New Technologies Applied to Education, Vocational Training, and Culture
   - Public Acceptance of New Technologies

4. General increases of scientific knowledge, particularly in:

- Biological Sciences
- High Energy Physics
- Solar System Exploration

REPORT OF THE WORKING GROUP ON TECHNOLOGY, GROWTH, AND EMPLOYMENT

GENERAL INTRODUCTION

"Revitalization and growth of the world economy will depend not only on our own effort but also to a large extent upon cooperation among our countries and with other countries in the exploitation of scientific and technological development. We have to exploit immense opportunities presented by the new technologies, particularly for creating new employment. We need to remove barriers to, and to promote, the development of and trade in new technologies both in the public sector and in the private sector. Our countries will need to train men and women in the new technologies, and to create the economic, social and cultural conditions which allow these technologies to develop and flourish. We have considered the report presented to us on these issues by the President of the French Republic. In this context we have decided to set up promptly a working group of representatives of our governments and of the European Community to develop, in close consultation with the appropriate international institutions, especially the OECD, proposals to give help to attain these objectives. This group will be asked to submit its report to us by 31 December 1982. The conclusion of the report and the resulting action will be considered at the next economic Summit to be held in 1983 in the United States of America."

Declaration of the Seven Heads of State and Government and Representative of the European Communities

Chateau of Versailles, June 4, 5, and 6, 1982

Consistent with this instruction, and at the initiative of the President of the French Republic, a Working Group of Representatives of Seven Heads of State and Government and Representatives of the European Communities was set up to consider the opportunities, problems, and challenges presented by technology, with special regard to economic growth and employment. The Working Group met for the first time on August 20, 1982.

Operating on the basis of consensus, the Working Group has produced this report which is essentially policy-oriented in nature and is addressed to Heads of State and Government*. The report is selective: it concentrates on our own countries, except where we state otherwise. It also concentrates on problems where science and technology offer potential solutions. But it does not pretend that science and technology provide a panacea. The Group has completed its task, and hereby presents its report.

* In this report the word "government" is also taken to include the European Communities.

1. IMPORTANCE OF SCIENCE AND TECHNOLOGY AS A BASIS FOR ECONOMIC REVITALISATION AND GROWTH

HISTORICAL ANALYSIS

Two hundred years ago, James Watt's invention of the steam engine, together with other inventions were to change the face of the world. In the following decades, our methods of work, our towns and countryside, our systems of transportation were all transformed. The introduction of the railway, the steamboat, and the telegraph stimulated our economies. Later, the internal combustion engine automobile, airplane, telephone, electricity, and the chemical industries began to change the quality and style of our lives.

This process of transformation and change stemmed from conviction that scientific inquiry and advance are central to progress. This confidence in science, which, since the Renaissance, was popular in intellectual circles, was to spread gradually to many disciplines, such as engineering and technology, and eventually, to industry itself. This was most evident by the end of World War II, when entire sectors of our economies existed as the result of the spin-off from scientific research. The progress which resulted was substantial in the agricultural, industrial, services and public health sectors.

While science and technology were modifying our method of work and our machines so profoundly, our organisations and institutions were also changing. Financial, trade, administrative, educational and legal systems all underwent far-reaching transformations in order to adapt to the new world that was emerging. Thus, in a thousand of different ways, science and technology has penetrated the very fabric of our societies and of our lives.

Research, which can start modestly in the form of a laboratory experiment or an equation written on a blackboard, can eventually lead to a vast and varied number of applications. This has been the case with fundamental research carried out on the structure of atomic nuclei, which led to the discovery of nuclear energy. Research on solid state physics has radically transformed or created an immense range of products and systems such as digital watches, television receivers, video-recorders, health care equipment and many other familiar products. Space research programmes have yielded many valuable benefits in fields such as telecommunications, remote sensing, new materials, and transport systems. The theoretical understanding of the part played by nucleic acids in the transfer of genetic information arose from the discovery of DNA but also promises a vast range of applications in the field of biotechnology, from health to food.

These examples of successful technological innovation have one thing in common: ideas emerging from excellent fundamental research

have been developed by entrepreneurial industrialists into goods and services which meet the needs of society.

But industrialisation has also created new problems: severe strains on our material resources and on our environment, fundamental changes in our life style, and increased attention to modern weapon systems. More recently, the slowdown in economic growth and increasing unemployment has coincided with some lack of public acceptance of new technologies. At the same time, we have witnessed an explosive growth of population, particularly in the developing countries, many of which are suffering from severe economic strain.

Thus, despite all mankind's achievements, many problems confront the industrialised and the developing countries today.

Major advances in science and technology have caused profound changes in our way of life for more than two centuries. These developments continue today at an even greater pace.

FUTURE POTENTIAL

In the near term, new technologies will be diffused throughout society largely through the mechanism of competitive enterprise. Advances in information technology combined with progress in computers, video-recorders, and telecommunications can transform education, increase the efficiency of our organizations, and permit better use of human and material resources. Incorporation of microprocessors into existing technologies can produce a generation of new products of improved performance.

Robotics whose development is seen by some as aggravating an already serious unemployment situation, instead can free workers from hazardous and repetitive labour and can improve the productivity of industry. The same technology can be applied to the problems of the physically handicapped to produce artificial limbs and other devices that may help them.

Remote sensing can improve our capacity to protect our environment and to live in harmony with it, develop our natural resources, and predict our weather. Improvements in materials can create new technologies and enhance existing ones. The evolution of catalysis from an art to a science and improvements in membrane technology offer the possibility of new and more efficient chemical processes. Biotechnology has vast potential for the production of pharmaceutical products such as insulin, the synthesis of industrial chemicals, the development of new agricultural species and the more efficient recovery of mineral resources.

In the field of energy, fast breeder reactor technology will soon offer a major increase in the efficiency of electricity generation from uranium. In the longer term, thermonuclear fusion, one of the most challenging technologies ever conceived, may offer a virtually inexhaustible source of energy from ordinary seawater.

It is vital to remember that the technologies we are applying today are founded upon the scientific research and development of yesterday. Hence, the well-being of society in the next century will rest on the application of scientific research which is being carried out now.

The importance of fundamental scientific research in the birth of new industries cannot be over-emphasized. The role of government support of science to inspire the future economic and social development of our countries should be widely understood.

Finally, the historical tradition in science of international cooperation and free communication, which has been so important in the past, should be continued and expanded in the future for our mutual benefit and progress.

Fundamental scientific research is one source of technological progress in industry and should be given special support by governments.

2. THE EFFECT OF SCIENCE AND TECHNOLOGY ON THE LEVEL OF EMPLOYMENT, THE IMPROVEMENT OF LABOR CONDITIONS, AND THE ADVANCEMENT OF CULTURAL AND EDUCATIONAL STANDARDS

THE LEVEL OF EMPLOYMENT

The problem of unemployment and its costs in human and social terms is a major pre-occupation in our countries. For this reason, the positive role which science and technology can play in increasing employment should be closely examined.

The transformation of new technological knowledge into investment in innovation is essentially a micro-economic decision for individual firms and entrepreneurs. The process is conditioned by the individual decision-makers' perception of the predicted profitability and of the economic and social environment, including the probable behaviour of government.

Thus, individuals decisions increase employment in innovative firms while causing lay-offs in others. Overall, it is even possible that innovation could, at least in the initial stages, destroy more jobs than it creates.

However, through the whole period of industrial history, technological innovation has not only proved to be one of the major sources of social and economic progress, but it has also markedly increased the overall level of employment.

To outweigh the potential of job destruction from innovation with job creation, a growth conducive economic and social environment is essential. The existence of a stock of promising but unrealised innovation certainly favours the creation and maintenance of such an environment, as does a high degree of price flexibility and labour mobility and adaptability. However, this is insufficient if public and private demand is shrinking and confidence in future growth and stability is low.

Technological innovation can play an important role in the increase of the level of employment and the improvement of labour conditions. Special training programmes are necessary to promote flexibility, mobility and adaptability of labour.

SOCIAL EFFECTS

The benefits derived from the use of new technologies can result in real progress for the worker. The implementation of new technologies in the work place can free the worker from hazardous and repetitive tasks that can be readily automated. Technology can infuse a new prosperity into a region and give firms an opportunity to organize more effectively for growth. There will inevitably be changes in existing structures as the result of new technologies, although these changes can ultimately not only increase the level of employment and encourage growth, but create a more human environment for the individual. Further studies should be carried out on the

links between technological changes, the reorganisation and quality of work, and the effects of employment.

The expected changes present a challenge to society which demands an effective response. First, there is a relation between the types of technology developed and perceived social and cultural needs as well as purely economic ones. Hence, there is a need for wider public debate in science and technology. Secondly, education and training are necessary to prepare for technological change. Thirdly, the initial labour displacement effects, both qualitative and quantitative need to be allowed for: careful consideration must therefore be given to the reorganisation of work as well as to policies designed to give protection to the disadvantaged segments of the labour force, such as women and older workers.

Finally, as we have stated, although measures to increase the flexibility, mobility and adaptability of the labour force are very important, it is equally important that a good climate in industrial labour relations be maintained.

<u>Our nations should make better efforts to prepare their citizens for living and participating in a society of an increasingly technical nature.</u>

PUBLIC ACCEPTANCE OF NEW TECHNOLOGIES

Developments in industrialised societies show that new technologies often present problems of public acceptance. If a technology is regarded as unacceptably risky, threatening to the environment or to jobs, it may be resisted.

Resistance to new technology is not new. For example, in the ninteenth century, the introduction of steam cars was inhibited by the requirement that they should be preceded by a man carrying a red flag. More recently, there has been strong resistance to nuclear power and, in some cases, to new technology at the work place.

But a great many people are ambivalent in their attitude towards new technology. Those who resist new technology in the work place may accept it enthusiastically in the home. Microwave ovens, electronic calculators, video recorders and home computers are becoming increasingly familiar features of everyday life.

In many of our countries, much of the more vocal opposition comes from groups that are not in the majority. Some of this opposition may be justified, some may be widely exaggerated. Some of the fears expressed may even go beyond the technical considerations into the broad area of political grievances about society's values or about democratic processes. Diagnosis of this complex subject requires an appreciation that there are many

technologies, many publics, many institutions and many cultures. Although some work has been done in this area, there is little to suggest that we have any real understanding of the factors which shape public attitudes to a new technology. We need to improve this understanding if we are to derive the maximum benefit from the new technologies.

The fate of our scientific and technological innovations is largely a function of the willingness of the public to accept them. More attention to the problem of public acceptance of new technologies is needed.

IMPACT OF NEW TECHNOLOGIES ON MATURE INDUSTRIES

The impact of new technologies on "mature" industrial structures is most apparent in those industries which started the process of industrialisation and which, in former times, have constituted the most dynamic and dominant centres of economic progress. In the process of economic development, the old industrial centers were particularly vulnerable to technological change in other places. Efforts by governments to protect traditional industries against structural change, whether by subsidy or by other means, cannot be successful except in the short term.

On the other hand, there are clearly cases where adoption of new technologies can positively influence the development of mature industries by providing new opportunities for growth. It is industry which has the primary task of responding to the challenge of structural change: market forces will condition industry's response but social and other factors must also be taken into account. Governments, for their part, should pursue positive adjustment policies while bearing in mind future demand and supply structures and the opportunities for further technological development.

Further specific studies, such as those being carried out in the OECD, should be made to determine the extent, and the methods by which science and technology can contribute to the easing of the widespread adjustment problems in some regions which are often posed by the decline of traditional industries.

Special attention should be paid to the rejuvenation of mature industries through the use of science and technology.

3. IMPLICATIONS OF SCIENCE AND TECHNOLOGY FOR THE WORLD ECONOMY

IMPLICATIONS OF SCIENCE AND TECHNOLOGY POLICIES FOR WORLD ECONOMIC ACTIVITY

In the present circumstances of high and still rising unemployment in the world, the creation of new jobs in competitive industries has become an objective of central importance to our governments. Investment in innovation can play a decisive role in reaching this objective. In addition to its direct effect on demand, there are three distinct ways in which investment in innovation can help generate the basic conditions for a return to higher economic growth and employment:

Accelerating the process of innovation will:

- First, facilitate the structural adjustment of the supply sides of our economies, easing inflationary pressures related to structural rigidities.

- Secondly, improve cost/price ratios through productivity increases.

- Thirdly, generate an investment-led recovery, which will reduce potential supply bottlenecks, and thus, the risk of fresh inflation occurring before more satisfactory employment levels have been restored.

If the process of innovation is to have these effects, productivity gains should be used both for higher consumption and increased investment. In this way, an increase in demand can be sustained. A proper distributional balance of productivity gains may improve not only the over-all economic outlook, but also the employment situation.

Sustained technical progress is best promoted through a balanced distribution of productivity gains between further investment and increased consumption.

THE ENCOURAGEMENT OF ECONOMIC GROWTH BY THE INTERNATIONAL FLOW OF TECHNOLOGIES

The international flow of technologies takes many different forms: it occurs between countries, universities, firms and individual scientists. The pattern is complicated: some links are carefully planned and organized, others occur by chance. But the result is a flow that has encouraged the birth and growth of new technologies. At a governmental level, numerous formal cooperative arrangements serve to facilitiate contacts and augment already extensive informal arrangements.

Important exchanges also occur in the private sector. An open trading system encourages this flow of information which strengthens the innovative process.

Nevertheless, care must be taken by governments to control the transfer of sensitive technologies of military significance to our countries.

The impact on the world economy of advanced technology industries can be enhanced by creating, through international cooperation, a climate which fosters advanced technology development, application, and exploitation. The following factors are conducive to such a climate:

- an open and competitive trading system to promote technological development by reducing trade barriers and other barriers and facilitating the cross border flow of technology in the most appropriate ways.

- compatible and, where possible, harmonized regulatory and testing systems to facilitate free trade.

- interdependence amongst partners who nevertheless respect each other's autonomy.

Such conditions will contribute to a healthy world economy characterised by steady non-inflationary growth. This will provide the foundation for long-term social benefits.

An open and competitive trading system between automomous but collaborating partners should be strengthened by harmoninzing and making more compatible our regulatory and testing systems. Care must be taken by governments to control the transfer of sensitive technologies of military significance to our countries.

THE EFFECTIVE UTILISATION OF SCIENCE AND TECHNOLOGY BY THE DEVELOPING COUNTRIES

The contribution of scientific research to developing countries has been spectacular in a number of fields. In health, for example, years of international research has resulted in smallpox being practically eliminated. In agriculture, innovation has brought new varities of high-yielding wheat and rice which have markedly increased the world food supplies.

The world economy as a whole can benefit from healthy non-inflationary economic growth among the developing countries. But the model of industrialisation and economic development which our countries have followed is not necessarily the one which the developing countries should adopt. It is for the developing countries themselves to establish their priorities and their policies, since it has to be recognised that simplistic and mechanical transfers of new technologies to these countries can create, at least in the short term, serious social as well as economic imbalances.

The greater part of the world's scientific resources are to be found in our own countries. There are substantial differences among developing countries, and hence, there is a need for many different forms of technology transfer. Many substantial programmes are already in place while recently some new and imaginative mechanisms have been developed by some of our countries. One key element of these mechanisms is the training of researchers to enable them to work on applied research problems within their own scientific institutions in accordance with the priorities set by their own governments.

Nevertheless, much remains to be done to harness the resources of science to the needs of the developing countries. We should continue our efforts to make training opportunities available to scientists and engineers from the developing countries in our universitites, government laboratories and industries. In our universities and laboratories, there are already hundreds of thousands of students and post-doctoral candidates from the developing world taking advantage of these opportunities.

The question of ensuring favourable conditions for the return of these researchers to their countries of origin and their re-insertion into their countries' professional life must be given very careful attention by the developing countries as well as by ourselves. It is important that the developing countries create their own scientific and technological capacities so that each can determine its own socio-economic and cultural path.

While governments have a central responsibility for all these activities, it must be stressed that private firms, including multinational corporations, have major achievements in this field. In particular, it should be acknowledged that an increasing number of companies have adopted codes of conduct that reconcile the benefits of an active technology transfer with the need to respect the priorities established in the developing countries by their governments, and the cultural values of the countries concerned.

Science and technology are not panaceas. They are only one of the means of promoting development. It is the responsibility of the developing countries themselves to make their choices and the necessary adaptations to the technologies they create or import. But increased efforts are needed by our governments to understand the problems faced by developing countries in the development and exploitation of technology.

Science and technology can be applied to many of the problems faced by the developing world. As developing countries create infrastructures in science and technology, our own countries should recognise the constructive role which they are able to play, mindful that it is the responsibility of the developing countries, as sovereign nations, to establish their national policies and priorities.

4. THE ROLE OF GOVERNMENTS AND THE PUBLIC AND PRIVATE SECTORS IN SHAPING THE SOCIAL AND ECONOMIC CONDITIONS FOR OPTIMUM IMPACT OF INNOVATION ON GROWTH AND EMPLOYMENT

PRIMARY RESPONSIBILITIES OF GOVERNMENTS AND THE PUBLIC AND PRIVATE SECTORS*

The long-term health of our economies revolves round the ability of our governments to encourage innovation in the public sector, private industry and in our scientific research communities.

The public sector's responsibility for shaping the social and economic framework for innovation and growth is beyond dispute. Governments, or their agencies, can determine the regulatory, economic, and commercial environment within which the private sector can develop.

But governments should recognise the role of competition and of the private sector in the development of near term commercial technologies. In general, this competition in the innovation process helps to bring the best products to the consumer at the lowest price. Remembering that innovation is inherently risky, governments should help to create an environment which on the

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* For all countries the phrase "public sector" refers to governments, in some, it also extends to other activities under public ownership.

one hand provides a predictable regulatory framework, low inflation and interest rates and a fiscal structure which rewards enterprise, and on the other hand facilitates the acceptance of new technologies in the work place and by the public more generally.

It is also important to recognise the respective contributions which the different sectors can make to the actual process of innovation. To the private sector falls the task of identifying opportunities for the productive uses of new technologies and matching applications of technology to market needs. Governments, for their part, have specific responsibilities which include the sponsorship of basic research, and research of far-reaching but uncertain applicability, whose social benefits may not be matched by immediate commercial returns.

The demarcation of the sectors' respective roles is not easy and depends on the individual situations in our countries: this is, in any case, less important than the establishment of workable mechanisms and a suitable climate which allows both sectors to function together in an optimal manner.

The market introduction of new technologies is primarily the task of the industrial and commercial sectors. A competitive atmosphere is essential for this type of innovation since it creates a continuous evolution of technological progress and, thereby, long-term economic growth. Governments should support fundamental science and long term, high-risk research and development activities.

GOVERNMENTS' OVERALL ECONOMIC POLICIES

The overall stance of an economic policy is decisive in shaping the conditions for innovation to have a favourable impact on sustainable economic growth and the creation of jobs in competitive industries. Uncertain expectations regarding rates of inflation, exchange rates and the level of interest rates make it more difficult for investors to interpret the market signals represented by changes in relative prices while expectations of increasing labour costs are likely to favour expenditure designed to save labour.

The innovation process is helped by a stable, low inflationary, environment with predictable government policies. Consistency and continuity of policy measures and confidence in the future encourage medium and long-term investment programmes. It is this kind of environment with mobile labour forces and capital, and with a flexible response to changes in demand, technology or prices which enables an economy to be kept more easily on a path of macro-economic equilibrium and orderly expansion.

Government policies should therefore be geared to increasing micro-economic flexibility rather than hampering it, and to promoting growth through balanced macro-economic policies thereby inducing confidence to all those involved in the process of innovation.

Under present economic conditions, technological collaboration in areas which are promising at the scientific research level can be hampered by increasingly defensive strategies aimed at protecting market shares. The implementation of a programme of international collaboration in the field of science and technology can contribute to, and benefit from, the restoration of expansionary non-inflationary conditions: both technical progress and employment could be favourably influenced.

Thus, while each of our governments must continue to have national responsibility for the choice of appropriate demand and supply policy mixes, greater collaboration on policies affecting innovation will hasten the return to growth.

Governments need to generate and support the framework conditions for workable competition and provide incentives for innovation through the encouragment of invention and investment in innovation.

REGULATORY, PATENT, TAX AND TRADE POLICIES

Governments possess a variety of instruments through which they can create a positive environment for technological innovation.

A predictable regulatory environment can promote innovation. While regulations are necessary in order to protect the rights, health and welfare of the public, a constant review of the

regulatory structure is necessary in order to balance the costs and benefits.

All our governments use the patent system to give protection to innovators in pursuing and marketing their ideas. The incentive for the private sector to develop new products and processes would be diminished without such protection. But many patents arise from work under government research contracts in universities, government laboratories and industry. It is important to ensure that those who develop patentable ideas in collaboration with government, do so on the basis of clearly understood patent rights which do not impede the introduction of the new technologies into the market place.

Many countries, in addition to allowing research and development expenditure as a tax deduction, have developed special tax incentives and other forms of government assistance for innovation, due to the inherent high risk nature of research and development and its anticipated social benefits. This special assistance for the innovation process is to be welcomed.

High technology industries may pose special problems for the functioning of the world trading system, in part because of the rapidity with which changes are taking place. Government policies can stimulate the development of a competitive world market and the expansion of world trade in new technologies. For example, the development of common standards on new products will allow them to be marketed more widely. Government policies should, however, seek

to avoid the creation of conditions that might lead to distortions and impediments to free and open trade flows.

The high efficiency and other beneficial effects which have emanated from the open multilateral trading system as it has developed since the Second World War could be endangered if government resources were used unfairly in a way which distorts normal international competitive activities in the development of products and processes.

Governments should therefore carefully explore ways to facilitate adjustments which seek to enhance the overall strength of their economies.

Governments, collectively and individually, have a responsibility to minimise distortions and encourage international trade in new technology, including products and services.

National policies in areas such as regulatory standards, tax, patent and trade all influence our ability to innovate and to reap the full benefits of innovation. The Group recognises and endorses the efforts of the OECD to resolve some of the problems we faced in this area. We reaffirm our commitment to removing barriers to an open multilateral trading system, to strengthing the rules in this connection, and to promoting the development of trade in new technologies, particularly for creating new employment, and therefore, shall seek to intensify our contacts bilateraly and in all relevant fora. In this regard, the Group takes note that discussions of these items will be pursued in the GATT Council.

NATIONAL POLICIES FOR THE PROMOTION OF SCIENCE AND TECHNOLOGY AND INTERNATIONAL CONSULTATIONS ON THESE

Science and technology are vital components of economic activity and of society; these in turn create the conditions in which science and technology can either flourish or wither.

It is important for governments to consider policies for:

- the promotion of science and the pursuit of knowledge for its own sake;
- the application of science and the development of technology;
- the integration of science and technology into economic and social policies; and
- international cooperation in science and technology, their application and their role in economic and social policies.

The promotion of science includes support for the acquisition of fresh knowledge and of new scientific skills, for the education and training of young people and the retraining of older people in new skills, for the dissemination of scientific knowledge to the scientific community and the education of the general public in science. A healthy climate for basic research in all sciences is an essential element in any free, industralised country: it is not possible to predict from which part of the spectrum of todays' basic research tomorrows' technological wonders will emerge.

The application of science and the development of technology involves the generation of an economic and social climate which encourages the growth of new technologies and the regeneration of old industries through the application of new techniques. Timing is crucial in both cases and it is important to recognise that assistance may be necessary to allow major change to take place smoothly and with due regard to the human problems caused by change.

The integration of science and technology into economic and social policies is essential if science and technology are to develop in a context which is acceptable to society and if science and technology are to be allowed to make their unique contribution to the solution of economic, social and cultural problems. Only in this way can the general public recognise and welcome the beneficial effects of science and technology and overcome their natural fear of technical change.

It is neither sensible nor necessary for these policies to be developed purely on a national basis. Science itself is, and always has been, international in nature. Even when international communications have been difficult, scientists corresponded with each other, exchanged research results, and debated ideas and hypotheses. This tradition among scientists has been a mainspring of scientific progress through the ages as well as a glowing example of peaceful and constructive competition to humanity as a whole. Science is now inextricably linked to technology, and hence, to economic and social progress. International trade and world travel

have meant that no free country can develop economic and social policies in isolation from the world environment. Our countries are interdependent with respect to economic policies, employment levels and the diffusion and uses of science and technology. This interdependence can be beneficial or a cause of conflict and hence a source of strength or weakness in the future.

Taking the progress of science as our example, we believe that interdependence is more likely to lead to strength and vitality if our countries cooperate in appropriate areas of science and technology and in their applications to economic and social activity. Whilst periodic consultations have taken place in the past in bilateral and multilateral meetings, we believe that these have sometimes been less effective because they failed to take sufficient account of the growing interface between technical activity and the socio-politico-economic environment.

Accordingly, a new thrust and fresh political will is needed from the highest level of government if international cooperation is to take its place alongside fair competition in helping science and technology to play their unique role in the solution of the problems which currently beset the world.

Science and technology are a source of national and international strength and can provide immense opportunities for revitalisation and growth of the world economy. They should therefore be given due consideration in all policy decisions for national development and international cooperation.

5. INTERNATIONAL COOPERATION IN SCIENCE AND TECHNOLOGY

PRESENT SITUATION

A large amount of cooperation in science and technology already exists between our countries: each country participates in bilateral and multilateral arrangements in a way which is too extensive to recount here in any detail, and a few examples must suffice.

The International Council of Scientific Unions (ICSU) has organised projects like the International Geophysical Year (IGU) and the International Biological Programme (IBP). Following the success of the IGY in 1958, 26 nations became parties to the Antarctic Treaty, which has amongst its objectives the encouragement of cooperation in scientific research. This has led to major advances in the sciences of climatology, oceanography, biology and geology. In the field of medicine, the World Health Organisation has stimulated cooperation in many fields of research including infectious diseases and carcinogens.

In some cases, cooperation in fundamental science has led to unexpected technological developments which have proved of great economic and social value to mankind. For example, the high degree of safety enjoyed by the millions of people travelling the globe by air and sea owes much to fundamental research in climatology and meteorology. Research on very accurate measurements of terrestrial distances from satellites has begun to show promise for the early prediction of earthquakes. The International Phase of Ocean

Drilling of the deep sea drilling project was designed to answer fundamental scientific questions on the structure of the earths' crust but has also provided information of real value to deep sea exploration. Work on high energy physics at CERN had led to such contrasting developments as improved theodolites for tunnel construction and a positron camera for medical tomography.

These examples demonstrate how international scientific cooperation is advancing science today and how mankind has benefitted from this in fields as diverse as medicine, travel, enginering, agriculture, energy and safety. Individual research workers, scientific societies, non-government institutions and government itself have all played key roles. The future environment for scientific collaboration will depend on a continuation of their complementary activities.

In the private sector of industry, cooperation naturally tends to be more technological than scientific; collaborative agreements or joint ventures need to take into account the rules of domestic and international trade. Scientific or technological information is often proprietary and companies cooperate through licensing and cross-licensing arrangements in order to advance their technological base.

Finally, mention should be made of cooperation between the private sector and universities, an historical link in some of our countries, but one which has new force today, and has played a major

role in the development of fields such as biotechnology. This collaboration will be increasingly important in the future as a stimulant for industrial innovation.

International cooperation in science and technology has demonstrated its value. Governments should continue to support cooperation, including the international scientific organisations.

THE SPECIAL RELEVANCE OF INTERNATIONAL COLLABORATION TODAY

In the present difficult economic circumstances that we are all experiencing, institutions responsible for scientific and technological research could be tempted to give more attention to their own science and technology activities to the detriment of international collaboration.

This risk should be recognised: with the present worldwide economic and social problems, there is a special and growing significance for international cooperation in the fields of science and technology, because only by such cooperation is it possible to:

- increase the effectiveness of national research work by rationalising it and reducing its cost;

- take into account the international character of certain research projects;

- create a climate which permits research to be tailored to the new situations in the international market-place;

- resolve jointly certain common problems and thus avoid useless duplication and promote a diversity of approach;

- cope with factors such as the expanding scale of technology, the increase in development costs, and the ever greater challenges of research and development; and

- enhance growth and employment.

With current economic difficulties and with national budgets subject to greater constraints, it makes even more sense to cooperate internationally, in particular, in long term, high-risk research and development projects.

GOVERNMENT POLICIES ON SCIENCE AND TECHNOLOGY

To meet the needs for international cooperation in science and technology, governments should incorporate within their policies, the following specific objectives:

- to encourage international science and technology exchange and the dissemination of knowledge;

- to encourage international collaboration at all levels where this is appropriate; and

- to seek cooperation in, and in certain cases joint operation of, large scientific research installations, the cost of which is prohibitive for a single government but which are nonetheless indispensible for the advancement of science.

In order to achieve these objectives, our governments should consider:

- enhancing the appropriate conditions for exchanges of knowledge (via scientific publications, for example) and of researchers. In the latter case, governments should generate conditions which will increase their mobility and allow eventual reinstatement upon their return.

- giving increased emphasis to the education and training, not only of the scientists themselves, but of the population as a whole, to encourage the practical application of new technologies; and

- undertaking a regular evaluation of the results of scientific research in order to assess whether the planned goals have been attained and, if not, the appropriate course for future action.

Already existing international cooperation in science and technology should be continued and, where appropriate, enlarged. An effective exchange of idea and researchers must be strongly encouraged.

POTENTIAL AREAS FOR COOPERATION

The Working Group has determined that it is in our common interest not only to endorse existing international cooperation, but also to refocus or to change its scope. In addition, a number of specific areas for cooperation in science and technology were examined by groups of experts. The topics for cooperation were selected with the following objectives in mind:

- to stimulate conditions for growth;
- to encourage education and training at all levels;
- to improve living and employment conditions; and
- to protect the environment.

In order to achieve these objectives, the Group agreed on four criteria to be used for the selection of collaborative projects. They should:

- benefit from international cooperation and involve several countries in the Working Group.

- be within the public sector or within the clear responsibility of governments;

- represent a potentially major step forward in science or technology if successful;

- involve possible interest by the developing world.

As a result of the examination, the Group has proposed to governments a number of cooperative research projects which are listed at the end of this report.

The cooperation begun under the auspices of this Working Group forms a solid base for future action and should continue in the relevant fora.

Finally, we recommend to our Heads of State and Government that, bearing in mind the role that science and technology can play in improving economic growth and employment, and in stimulating culture and eduction, they take science and technology into account in their policy decisions and continue to include the subject on their agenda at future Summit meetings.

PROPOSALS FOR COOPERATION

The identification of projects which meet all economic and social needs and are agreed upon by all participants would have required a much longer exercise than was possible for the Working Group. The choice of projects therefore does not reflect the priorities of all delegations to the Working Group, let alone the priorities of other countries. Nevertheless, the Working Group is unanimous in its belief that these projects constitute a solid base of cooperation.

The Working Group has reviewed a number of scientific and technological issues with a view towards determining where additional international collaboration could best contribute to increased understanding and improved social and economic conditions, not only for our own people, but for all the world.

In this process, we noted that a wide range of cooperation is already under way in the following important and wide spread areas:

- Conquest of space
- Renewable sources of energy
- Safety research on light water reactors
- Deep ocean drilling

We appreciate this effort and encourage its development using existing multilateral and bilateral frameworks.

Taking these considerations into account, the Group agreed to propose to governments a number of cooperative reserch projects along the following lines.

STIMULATION OF THE CONDITIONS FOR GROWTH BY BETTER MANAGEMENT OF ENERGY RESOURCES BY:

Photovoltaic Solar Energy (ITALY-JAPAN)*

The possibility of utilising photovoltaic technology for large scale energy supply depends mainly on future innovation related to higher quality and mass production of solar cells and related systems. This technology can make a helpful contribution to energy supply.

The objective of the project is to establish international collaboration among governmental research and development activities and to make the best use of government research facilities such as the Japanese solar simulator, EC Joint Research Centre, and the international research center which Italy is setting up.
The aim is to accelerate the application of photovoltaics and to establish adequate standards in order to ensure reliability.

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*Countries responsible for the organisation of the project.

Cooperative activities will include the following:

- holding joint meetings on topics such as the review of existing cooperative programs, and new cooperative activities which include the participation of both developed and developing countries;

- exchange of researchers and study missions especially on basic research;

- the development of common evaluation methods and standards;

- on-site joint study at research institutes and/or experimental photovoltaic installations.

Controlled Thermonuclear Fusion (EC-USA)

The final objective of research and development work on controlled thermonuclear fusion is to bring to fruition a new energy source using fuels which are practically inexhaustible and which possess potential advantages from an environmental point of view. The development of this new energy source will take some decades and require a considerable financial effort of the order of tens of billions of dollars.

The fusion research and development programmes currently in progress in the United States, Europe and Japan are all aimed at a

demonstration fusion reactor. Coordination of the three programmes on the conceptual design of the next generation facilities would be desireable. It might lead to the possible construction of a joint facility. Because of the time scale involved, it is not too soon to begin discussions on this project and to promote collaboration based on existing activities.

Collaboration could be developed along the following lines:

- Access of partners to facilities already existing or under construction, such as TFTR in the U.S., JET in Europe and JT-60 in Japan.

- Sharing of development programmes, in particular the pursuit of alternative lines of development.

- Development and joint use of costly equipment, such as the large coil facility, where duplication would be unnecessary.

- Coordination of development programmes for a demonstration reactor and next generation machines.

Photosynthesis (JAPAN)

Photosynthesis may be an increasingly important source of energy in the future because it is a natural process which converts abundant and everlasting sunlight into chemical and electrical

energy. International cooperation can further basic research on photosynthesis and photoconversion, including the development of artificial photosynthetic systems.

This research program could contribute to the supply of energy in the 21st century and thereby have great effects on future economic activity. The participating countries wish to encourage cooperative activities among their scientific communities by using the existing framework for international cooperation.

The forms of cooperation will include the following:

- cooperative research through exchange of scientists;
- collaborative use of facilities and equipment;
- information exchange through international seminars and symposia.

Fast Breeder Reactors (FRANCE-USA)

All our countries believe that nuclear power will play an essential role in meeting their prospective demands for electricity. The current generation of thermal reactors plays its part in meeting present demands. But in the long run, fast breeder reactors, which utilise an essentially inexhaustible energy source, offer great potential. At present, breeder costs are not competitive with coal or thermal reactors, but further progress in research and development could make the breeder economically attractive in the next few decades. From a technical standpoint,

the breeder is much further advanced in development than other "renewable" energy technologies such as fusion and solar energy.

International collaboration in fast breeder reactor research and development can make a key contribution to making this technology economically viable. A great deal of collaboration is already taking place among our countries; but more can be done in areas such as design, safety, safeguards and fuel cycle facilities. Discussions are currently under way among our countries to expand cooperation in these areas and those efforts should be pursued vigorously.

BETTER MANAGEMENT OF FOOD RESOURCES BY:

Food Technology (FRANCE-UK)

There has been major progress in agricultural technology in the past two decades in our countries, but more attention should now be paid to food and food technology. While there is still scope for improving agricultural productivity and utilisation of agricultural raw materials in the developing countries, there is also a need to increase the efficiency and quality of food production in OECD countries. In addition, more attention is being paid to the safety of food additives and to novel foods; and present initiatives should be supported.

Three aspects of the topic are identified as worthy of collaboration: food processing, safety evaluation and developing countries aspects. For food processing, there is scope for collaboration on food research programmes and for the application of existing research knowledge. In safety evaluation, there are many international initiatives in food laboratory practice, harmonising testing guidelines for food additives and novel foods, which need continuing support. There is also scope for coordination of fundamental research programmes aimed at the validation of alternative testing systems and on developing and understanding mechanisms of toxicity. Developing countries aspects can best be satisfied by closer collaboration in research and training, increased processing yields, improved utilisation of raw materials, improved storage of agricultural produce and avoidance of food wastage. The initiatives should be pursued largely through existing mechanisms.

Aquaculture (CANADA)

The sciences basic to food production are being applied increasingly to the culture of aquatic organisms, with numerous aquaculture systems being on the threshold of significant expansion. Such development is encouraged by the special need for employment opportunities in rural areas, by the demand for new and appropriate technologies in fisheries, and by the evidence that natural fish resources are now being exploited to their limits.

Expansion of aquaculture systems in both developed and developing countries seeking greater self-sufficiency in food supplies could also create indirect benefits such as an improved investment climate.

Objectives of this project are to develop and adapt to cool water environment technologies for intensifying the production of fish, shellfish (including crustaceans), and marine plants. It involves the use of existing institutions, and the establishment of a research and development planning group.

IMPROVEMENT OF LIVING CONDITIONS, EMPLOYMENT, AND PROTECTION OF THE ENVIRONMENT, THROUGH:

Remote Sensing from Space (USA)

Satellite remote sensing is an important tool in monitoring and understanding environmental phenomena, including those influenced by human activity. Because many of these phenomena are global, international cooperation is essential and is already well developed. Data from remote sensing satellites in orbit are also used extensively by many countries. Our countries are coordinating their efforts to achieve compatibility of remote sensing data. We envisage a succession of earth observation satellites developed individually or cooperatively as well as the provision of training opportunities, particularly for developing countries. To facilitate

use of data from different satellite systems, informal multilateral groups have been formed for technical coordination among operators of national systems.

Through various bilateral arrangements, our countries have cooperated in space activities, in some cases, contributing instruments to each other's satellite systems. Such arrangements provide both cost-savings and coordination of data systems. Expanded cooperation should be pursued in the area of national and existing multinational remote sensing activities in support of such international environmental programs as the World Climate Program. In addition, increased emphasis should be placed on cooperation in the areas of polar orbiting meteorological satellites, ocean remote sensing, geostationary meteorological satellites, land remote sensing products and archives, and coordinated flights of remote sensing instruments.

High Speed Trains (FRG-FRANCE)

In recent years modern high speed wheel-on-rail systems have been successfully introduced by Japan (Shinkansen) and later by France (TGV), with significant effects on rail transport and on the economy in general. In the United Kingdom (APT) and the Federal Republic of Germany (ICE), similar systems are under development. In parallel, next-generation systems based on magnetic levitation are being developed in Germany and in Japan. The German "Transrapid 06" designed for speeds up to 400 km/h and carrying 200 passengers, will begin tests runs on a 21 km track in 1983; smaller Japanese test vehicle in 1979 achieved a top speed of more than 500 km/'

Based on these developments, the following proposals are made:

- Enhance cooperation between those countries which work on and have an interest in the future development of high speed ground transport systems and encourage the exchange of scientific, technical, and economic data and other information on such systems.

- Feasibility studies for high speed ground transport networks, (including their socio-economic aspects), focusing on Western Europe, and, if appropriate, North America and Japan. These studies may provide a basis for investment decisions having strong political and economic impacts.

Housing and Urban Planning for Developing Countries (FRANCE)

This project relates to one of the major problems of the latter part of this century: the explosive growth of towns and cities in the developing countries.

At the beginning of the 21st century, the world population will have reached 6 billion, half of whom will be living in towns. Forty conglomerations of the developing world will each have over 5 million inhabitants. The construction of many millions of relatively inexpensive dwellings in developing countries is imperative if the living conditions of the urban and rural populations are to be improved.

The project is not aimed at creating a new aid organisation, but at improved efficiency of existing national and international organisations.

Three approaches have been proposed:

- Exchange of information on programmes and projects;

- Coordination of technical training programmes for the habitat in developing countries. The first steps would be to evaluate training programmes available in the industrialised countries, and to improve the links of such programmes with the research sector, and their application;

- A research programme and experiments on relatively inexpensive dwellings in the developing world.

Advanced Robotics (FRANCE-JAPAN)

The industrial sectors in our countries are increasingly developing and utilising robots. Our governments support more basic and long-term research in these areas. Among the areas particularly appropriate for governmental action and cooperation are advanced robot systems that avoid the need for people to work in difficult or dangerous conditions or environments.

Development of advanced robot systems to work in such conditions or environments will require new technologies which are far more advanced than those embodied in today's industrial robots. International cooperation among developed countries to develop such technologies is highly desirable.

Cooperative activities would be flexible and carried out in phases in the following ways:

- discussion, in a joint coordinating group, of possible subjects for cooperation such as effective international collaboration, appropriate intellectual property protection, and possible technology transfer.

- Exchange of data, information, researchers and study missions;

- Examination of suggestions for common standards, establishment of common criteria for evaluation, and joint evaluation and experiments.

Impact of New Technologies on Mature Industries (FRANCE-ITALY)

One of the important aspects of new technologies, and notably of microelectronics, informatics, robotics, new materials and new energies, is their horizontal diffusion into many production activities. The introduction of these new technologies provides an excellent opportunity to modernise and rejuvenate traditional sectors at the production, management and marketing level.

This complicated process of technological modernisation requires a systematic interdisciplinary approach. Moreover, it needs to take into account international factors such as the structural adjustments occuring in the related industries in those developed and developing countries.

Individual governments are pursuing systematic efforts in this direction. Italy, for example, is currently studying the impact of the introduction of micro-electronics and information technology in several branches of the textile industry. In the FRG, a similar government-sponsored project has been undertaken in the printing industry.

At the international level, for instance, OECD has established a programme to analyse periodicaly the structural adjustments occurring in several different mature industrial sectors such as textiles, steel, shipbuilding, automobile, pulp and paper, aluminium, machine tools; and to evaluate the opportunities offered by some advanced technologies such as robotics and information technology.

It is important that the findings of these national and international efforts be taken into consideration when tackling specific projects on this subject. Related aspects such as social acceptance of technological change, cultural tradition and training needs should also be considered. Comparison of as many case studies

as possible built on field experiments in different areas and countries can contribute to the definition of a common methodological approach.

Biotechnology (FRANCE-UK)

Biotechnology will have significant economic and social impacts on both developed and developing nations. It is already currently the subject of some commercial activity. At this stage, the commercial benefits of some biotechnological processes are far from clear and probably unlikely to be realised in the short term. Many of our governments have national programs which concentrate on basic research in this field. It is therefore appropriate to consider international cooperation so that limited national resources are not wasted by unnecessary duplication. If managed carefully, such collaboration should accelerate the development of some aspects of biotechnology, thus increasing economic activity and employment. The commercialisation of biotechnology could also be of significant interest to developing countries in the upgrading of raw materials.

The aims of the project are to obtain essential information on enabling technology at a lower cost than through purely national programmes; and at the same time, assist in the training of biotechnologists for the needs of developed and developing countries.

A network is proposed to link existing training centres and any new centres which may be established by individual countries to serve the needs of developing and developed countries and be coordinated through a Committee.

The rate of commercialisation is affected by the regulatory processes in each country particularly for health and food products. Representatives of the participating governments should meet to develop common guidelines for codes of practice for safety evaluation of new products arising from biotechnological processes.

Another aspect of the proposal concerns "orphan drugs". An international network of advanced biotechnology units with a specific interest in basic research needed for the development of drugs for diseases hitherto not amenable to pharmacotherapeutic control would be established to allow a coordinated approach in our countries to development of drugs of this type.

This work should be implemented with the full knowledge and continuing cooperation of the International Federation of Pharmaceutical Manufacturers Associations, and in consultation with the World Health Organisation.

Advanced Materials and Standards (UK-USA)

We all recognise the critical importance of the materials used in mechnanical, constructional and electronic engineering. The

availability of suitable materials with advanced properties and performance will determine the rate of introduction of many new technologies and new industries.

The objective of the present proposal is to encourage the setting up of codes of practice and specifications for advanced materials on an internationally coordinated basis. Such codes create the conditions for the rapid adoption of materials by industry. New materials enlarge technological perspectives and catalyse innovation.

The provision of advanced materials standards depends on a number of factors: the enabling technologies, advanced testing, predictive and investigative techniques, data bases and the use of large centralised test equipment. Specific projects will be aimed at the development of standards on new materials (such as composites or engineering ceramics) and also on improvement of existing materials and processes (such as materials produced by recycling and joining technologies).

The intention is to establish an international research collaboration for the preparation of codes of practice and standards on advanced materials. This will be conducted on a flexible basis, with each participating member using existing resources. Recommendations arising from this collaboration would be submitted to the International Standards Organisation as a basis for standards having international status.

New Technologies Applied to Education, Vocational Training and Culture (CANADA-FRANCE)

The aim of this project is the coordination of basic and long-term work aimed at improved access to information and at the effectiveness of training. The achievement of this aim would contribute to better employment opportunities and hence to economic growth. New technologies to be applied to education, vocational training and culture will include basic research on computer assisted learning, the future electronic image (advanced computer animation and interactive imaging), information access technology in future systems (computer-assisted translation and technology links) and telesoftware.

An important objective of the project is to encourage collaboration between different governmental working groups in participating countries in order to improve appropriate transferability and exchange of these technologies. It is proposed that the organisations participating in this project may, after review of existing international coordinating mechanisms, define appropriate joint activities including information exchange, organisation of symposia and workshops, and launching of common pilot projects.

Public Acceptance of New Technologies (UK)

Public acceptance conditions the environment in which all new technologies operate and therefore has an important bearing on growth and employment. If technologies are regarded as unacceptably risky or threatening to the environment or to jobs, they can be, and frequently are, resisted.

It is possible to distinguish between different publics and different dimensions of the public acceptance problem. For example, the same individual can respond enthusiastically to new technologies as a consumer but negatively in the workplace, where technlogies are frequently seen as threatening to jobs, status and skills. The roots of opposition to new technologies may sometimes go beyond technical considerations, for example, they may be more concerned with political grievances about values or democratic processes.

A number of general lessons can be drawn from experience with the introduction of new technologies. In view of the importance and complexity of the subject, and the lack of understanding about it, a programme of studies should be undertaken encompassing the following themes:

--General background studies, which would draw lessons from the history of the introduction of new technologies and indicate the role which cultural differences play in determining public acceptance.

--Studies to focus on the way organisational changes need to be made to accommodate new technologies and on ways of involving the public in decisions.

--Assessments of the future impact of new technologies.

GENERAL INCREASES IN BASIC SCIENTIFIC KNOWLEDGE, PARTICULARLY IN:

Biological Sciences (EC)

Biological sciences have made enormous progress in recent years and this momemtum needs to be maintained. Knowledge of the basic structures of living systems and their functions --including the fast developing areas of cell adaptation and communication-- provide a powerful basis for the development of a wide range of applications in agriculture, health care, environmental control and other growth sectors of the world economy.

The complexity of modern biology (with its increasing need for expensive instrumentation, computing facilities, special laboratories and world-wide field surveys) points to the need for increased international collaboration. Further, modern biology has a major requirement for the collection, processing, retrieval and interpretation of huge quantities of data and information.

There is a need for continuing discussions between scientists in our countries on cooperation on biological banks covering, for

example, plant and animal preservation material, nucleic acid and protein sequence data, micro-organism strain collections, and seed banks.

There is also a need for improved collaboration on the use of some of the important new tools in modern biology and medicine: synchrotron radiation facilities, cyclotrons, electron microscopes, neutron sources and nuclear magnetic resonance equipment, and space and deep ocean laboratories. Some biological phenomena, such as the evolution of ecosystems, desertification, and transborder pollution have a world-wide dimension which can best be tackled by international collaboration.

High Energy Physics (USA)

High energy physics is an important basic research activity which addresses the most fundamental questions of the nature of matter. This field has had many spinoffs of direct application to other areas of science and technology. Experimental research in high energy physics requires the use of a limited number of expensive particle accelerators and colliding beam facilities which have been constructed with government support.

A few large and costly machines are being constructed in different regions of the world to meet future needs. It is anticipated that scientists from each region will continue to be able to participate in experiments at these large facilities on the basis of the scientific merit of their proposals. Such

international collaboration avoids unnecessary duplication of costly facilities.

In the mid-1990's further progress will probably require a new generation of very high energy accelerators costing huge sums of money. Such facilities are likely to exceed the financial capabilities of any single nation or region. An international cooperative programme should therefore be considered. The decade of effort required for definition, design and construction indicates that these discussions should begin in the near future.

Solar System Exploration (USA)

Scientific interest in the sun, planets, comets and asteroids lies in the expectation that their investigation will contribute greatly towards our understanding of the earth, the origin and evolution of the solar system and the origin of life in the solar system. In the last two decades, new and far more powerful scientific and engineering tools have revolutionised the exploration of the solar system. There is a long history of fruitful international cooperation in solar system research resulting from the realisation that by pooling capabilities and resources, the parties involved gain scientific, technical, and financial benefits.

Our countries endorse and encourage solar system exploration. We emphasize the need for a continuation and expansion of the various methods of cooperation and for planning to develop more cost-effective means of solar system exploration.

SUBJECT

ce master
CPS

LE PRÉSIDENT DE LA RÉPUBLIQUE

Paris,
Le 8 février 1983

PRIME MINISTER'S
PERSONAL MESSAGE
SERIAL No. T 10c/83

Madame le Premier Ministre,

Lors de la première séance de travail du Sommet des Pays Industrialisés à Versailles, le 5 juin au matin, je vous avais exposé mes vues sur les relations entre "Technologie, Croissance et Emploi". Cet exposé avait été suivi d'une longue et fructueuse discussion entre nous. Dans la déclaration finale du Sommet, nous avions décidé de charger un groupe de travail d'en tirer les conséquences pour améliorer notre coopération en ces domaines. Il avait été également convenu que les conclusions de ce groupe et les actions qui en résulteraient seraient examinées au prochain Sommet des Pays Industrialisés.

Le rapport de ce groupe m'a été remis il y a quelques jours. Il met l'accent sur un certain nombre d'idées que je trouve très positives. Comme nous l'avions souhaité, il propose une série de projets concrets de coopération internationale dans la plupart des grands domaines d'avenir : espace, énergie, biologie, alimentation, habitat, informatique, nouveaux matériaux, robotique.

Il nous reste maintenant à décider des suites à lui donner et de sa publication éventuelle. Je vous serais reconnaissant de me faire savoir vos sentiments à cet égard. Je suis, pour ma part, très favorable à sa publication. Elle permettra d'engager avant WILLIAMSBURG la mise en oeuvre des actions qu'il propose.

Veuillez croire, Madame le Premier Ministre, et chère Amie, à l'expression de mes sentiments les meilleurs. - fidèles et cordiaux

François Mitterrand

François MITTERRAND

Madame Margaret THATCHER
Premier Ministre du Royaume Uni
de Grande-Bretagne et d'Irlande

10 DOWNING STREET

From the Private Secretary

MR R.B. NICHOLSON
CABINET OFFICE

VERSAILLES WORKING GROUP ON TECHNOLOGY, GROWTH AND EMPLOYMENT

The Prime Minister has noted the contents of your minute of 14 January.

A.J. COLES

17 January, 1983

(2)

Prime Minister

This is largely for information.

A.J.C. 14/1

W.021

PRIME MINISTER

VERSAILLES WORKING GROUP ON TECHNOLOGY, GROWTH AND EMPLOYMENT

Sir Robert Armstrong minuted you on the status of the Versailles Working Group discussions on 20 December. The final meeting of the Group is due to take place on 24, 25 and 26 January in Paris, after which it is anticipated that President Mitterrand will communicate the Working Group's report to Heads of State and Government.

2. The report will consist of an Executive Summary (draft attached, Flag A) which will conclude with a list of projects (draft attached as Flag B) and, possibly, an indication of which countries are leading and participating in each project (draft attached, Flag C). The main body of the report (draft attached, Flag D) will follow and will conclude either with a list of projects as extended abstracts or with the project papers themselves as an Annex. The projects which are asterisked in the lists flagged B and C are those where the Working Group is simply endorsing existing collaboration, and it is likely that these will appear in title only as in the last paragraph on page 4 of the Executive Summary.

3. The draft report has been circulated to Departments and the project papers circulated to relevant Departments. Clearance at Ministerial level has been obtained in most Departments. In some, clearance at Permanent Secretary level has been regarded as sufficient. Departments have had few comments on the draft report beyond saying that it is rather bland and optimistic. Lead Departments for each project have been responsible for deciding whether or not the United Kingdom would wish to participate in a project.

4. All the projects in which the United Kingdom has been involved as leader or co-leader have been discussed with enthusiasm at the meetings of the Working Group. The position on each of them is given in the Annex.

5. I believe we have been successful in achieving the objectives set out in my minute to you of 8 October. The bulk of the report is concerned with the theme of the harnessing of technology for economic growth and employment, leaving international collaboration in science and technology as just one aspect of this. The more ridiculous and harmful proposals in President Mitterrand's Versailles paper find no place in the report and the strongly French flavour has been effectively eliminated. Whilst the UK delegation has certainly played its part in removing French national interests from the report, we have also managed to maintain an excellent relationship with the French Chairman and the delegation who probably feel that we have been the most constructive of all the delegations. The projects which we have suggested or taken co-leadership in have all been very well received. None of them requires major new resources for implementation but each of them could make a contribution to the better harnessing of technology for economic growth. On developing countries we have played a part in restricting the references to these to the bare minimum but have managed to avoid publicly taking a negative attitude. Finally, together with the United States and Germany, we have been able to ensure that the report makes plenty of reference to the primary role of the private sector in scientific and technological innovation, so that the role of governments and the public sector are kept in perspective.

6. Admittedly the report can be correctly criticised as bland, anodyne and optimistic. However, I believe that the conditions of setting up the Working Group and the very short time it had to prepare its report make it unrealistic to expect the report to contain original wisdom. More important than the detailed content of the report is the fact that it has appeared as the result of a debate on science and technology and what they have to offer, conducted by Heads of Government in the Summit countries. If one believes that many of the

economic and social problems in the world have part of their origin in science and technology, and yet, apparently paradoxically, the solutions to these problems lie, again in part, in the better use of science and technology in the future, then it is surely right for science and technology to appear as a regular item on the agenda of future Summits. There is plenty of opportunity for constructive discussion and for new ideas. The present report should be seen as just a first and rather faltering step in this direction.

7. When you receive the report formally from President Mitterrand he will also raise the question of publication (mentioned in Sir Robert Armstrong's minute of 20 December) and distribution of the report to non-Summit countries. Following your earlier instructions on publication, the United Kingdom delegation will continue to take the line that the report should first be considered by Heads of State and Government. I will minute you further on the question of publication and on distribution to non-Summit countries when I have seen the French proposals in this area.

RBN.

ROBIN B NICHOLSON
Chief Scientist

Cabinet Office
14 January 1983

cc: Sir Robert Armstrong (with flagged material)
Mr Sparrow
Mr Gregson

A. Renewable Energy Sources

This project, led by the Department of Energy, examined the state of international research and development on renewable sources such as wind, waves, geothermal, and concluded that existing international collaboration was adequate for the current technical and commercial prospects for these technologies. The project is therefore likely to appear by title only but it has been valuable exercise in the sense that it allowed us to resist French attempts to take the responsibility for collaboration away from organisations like the IEA and set up French institutions to do essentially the same work.

B. Food Technology

This project, led by MAFF, has the objective of improving collaboration in research on safety evaluation and harmonisation of test methods, food processing, and technology transfer to the developing countries. We have proposed that the first two of these subjects be pursued through more effective use of the EEC R & D resources in this area and that the developing countries' work be done through FAO. At the meeting of the Working Group just before Christmas, the French asked for co-leadership of this project, which we granted them. I believe that we have a firm grip on the project and this request is unlikely to lead to any significant change in the work proposed. Again, I believe that the MAFF initiative effectively pre-empted a French initiative which would have been aimed at French national objectives.

C. Advanced Materials and Standards

This project has been led by the Department of Industry and the United States has been a co-leader but content to play a very secondary role. The project has an objective of improving co-ordinated research activity to provide an appropriate research base for the development of improved codes of practice and standards in the field of advanced materials. Materials technology is an enabling technology for many other areas of research and improved utilisation and trade in new materials will enhance the rate of development of several new technologies. A small Secretariat for this new international activity will be based at the NPL.

D. Biotechnology

This project was originally proposed by the French in a form which was unsatisfactory to the UK, and indeed to several other countries. We requested co-leadership and have been successful in totally reorienting the project so that it is consistent with UK interests and with our substantial reputation in this field. Instead of a broadly-based and very French-oriented project the proposed work is now confined to specific areas of biotechnology and the activity involving technology transfer to the developing countries will be carried out by a network of centres in each of the Summit countries.

E. Public Acceptance of New Technology

This project arose from your own comments at the Versailles Summit and has been led by the Department of Industry. The topic features strongly in the Main Report (paragraph 2.3) but is also the subject of this separate project. Three areas have emerged as worthy of further study: first, there has been little historical analysis of the factors which have influenced public acceptance of new technology in the past and the way this has varied from one country to another; secondly, different countries have a variety of organisations, institutions and methods for educating and informing the public on new technology. There has been little comparison of these and the results from them. Thirdly, there is considerable scope for prediction of the benefits and problems from future new technologies and hence for planning for maximum public acceptance of these.

A

Versailles Working Group on Technology, Growth and Employment

DRAFT FINAL REPORT - PROPOSED ENGLISH TEXT

EXECUTIVE SUMMARY

"Revitalization and growth of the world economy will depend not only on our own effort but also to a large extent upon cooperation among our countries and with other countries in the exploitation of scientific and technological development. We have to exploit the immense opportunities presented by the new technologies, particularly for creating new employment. We need to remove barriers to, and to promote, the development of and trade in new technologies both in the public sector and in the private sector. Our countries will need to train men and women in the new technologies, and to create the economic, social and cultural conditions which allow these technologies to develop and flourish. We have considered the report presented to us on these issues by the President of the French Republic. In this context we have decided to set up promptly a working group of representatives of our governments and of the European Community to develop, in close consultation with the appropriate international institutions, especially the OECD, proposals to give help to attain these objectives. This group will be asked to submit its report to us by 31 December 1982. The conclusion of the report and the resulting action will be considered at the next economic Summit to be held in 1983 in the United States of America."

Declaration of the Seven Heads of State and Government and Representative of the European Communities

Chateau of Versailles, June 4, 5 and 6, 1982

Consistent with this instruction, and at the initiative of the President of France a Working Group of Representatives of Seven Heads of State and Government and the Representatives of the European Community was set up to consider the opportunities, problems, and challenges presented by technology, with special regard to economic growth and employment. The Working Group met for the first time on August 20th, 1982.

Operating on the basis of consensus, the Working Group has produced a report which is essentially political in nature and is addressed to Heads of State and Government*. The report is selective: it concentrates on our own countries except where we state otherwise, it also concentrates on problems where science and technology offer potential solutions, but it does not pretend that science and technology provide a panacea.

In this report the word Government is also taken to include the European Community

The Group has completed its task, and its report contains the following conclusions and recommendations:

Major advances in science and technology have caused profound changes in our way of life for more than two centuries. These developments continue today at an even greater pace (1.1).

Fundamental scientific research is the source of technological achievement in industry and should be given special support by Government (1.2).

Special training programmes are necessary to promote flexibility, mobility and adaptability, especially amongst scientific and technical personnel (2.1).

The educational programmes of nations should prepare their citizens for living and participating in a society of an increasingly technical nature (2.2).

The fate of our scientific and technological innovations is largely a function of the willingness of the public to accept them. More attention to the problem of public acceptance of new technologies is needed (2.3).

Special attention should be paid to the rejuventation of mature industries through the use of science and technology (2.4).

Industrial innovation is best exploited through a balance of increased productivity and increased employment (3.1).

An open and competitive trading system between autonomous but collaborating partners should be strengthened by harmonising and making more compatible our regulatory and testing systems. Care must be taken to avoid the transfer of sensitive technologies of military significance to our countries (3.2).

Science and technology can be applied to many of the problems faced by the developing world. As developing countries create infrastructures in science and technology, our own countries should recognise the constructive role which they are able to play, mindful that it is the responsibility of the developing countries, as sovereign nations, to establish their own national policies and priorities (3.3).

The market introduction of new technologies is primarily the task of the industrial and commercial sector. A competitive atmosphere is essential for this type of innovation since it creates a continuous evolution of technological progress and, thereby, long-term economic growth. Governments should support fundamental science and long-term, high-risk research and development activities (4.1).

Governments need to generate and support the framework conditions for workable competition and provide incentives for innovation through the encouragement of invention and investment in innovation (4.2).

National policies in areas such as regulatory standards, tax, patent, and trade influence our ability to innovate and to reap the full benefits of innovation. We recognise and endorse the efforts of the OECD to resolve some of the problems we face in this area (4.3).

Science and technology are a source of national and international strength and can provide immense opportunities for revitalisation and growth of the world economy. They should therefore be given due consideration in all policy decisions for national development and international cooperation (4.4).

International cooperation in science and technology has demonstrated its value. Governments should continue to support cooperation, including the international scientific organisations (5.1).

With current economic difficulties and with national budgets subject to greater constraint, it makes even more sense to cooperate internationally, in particular, in long-term, high-risk research and development projects (5.2).

Already-existing international cooperation in science and technology should be continued and, where appropriate, enlarged. An effective exchange of ideas and researchers must be strongly encouraged (5.3).

The cooperation begun under the auspices of this Working Group forms a solid base for future action and should continue in other relevant fora. We also recommend to our Heads of State and Governments that, bearing in mind the role that science and technology can play in improving economic growth and employment, and in stimulating culture and education, they take science and technology into account in their policy decisions and continue to include the subject on their agenda at future summit meetings (5.4).

Finally the Working Group has reviewed a broad spectrum of scientific and technological issues with a view toward determining where additional international collaboration could best contribute to increased understanding and improved social and economic conditions, not only for our own people but for all the world.

In this process we noted that a wide range of cooperation is already underway in such important and wide-spread areas as the conquest of space, the safety of lightwater reactors, renewable sources of energy, and deep ocean drilling.

We appreciate this work and encourage its continuation under presently existing multilateral and bilateral arrangements.

We have also proposed to our Governments the following collaborative projects which are either new or incorporate significant re-focussing.

Groupe de Travail
- Technologie, Croissance, Emploi -
constitué par décision des
Chefs d'Etat et de Gouvernement
réunis au sommet de Versailles

Le Secrétaire Général

Paris, le 20 Décembre 1982.

* SAFETY OF LIGHT WATER REACTOR.

The objective is to encourage research on the safety of Light Water Reactor through holding of periodic workshops and collaboration on the research programmes on thermo-hydraulics and fuel behaviour.

* RADIOACTIVE WASTE DISPOSAL.

The objective is to encourage research on the environmental impact of radioactive waste disposal through setting up an international working group as a forum for collaboration for the research programmes of participants.

SOLAR CELL.

The objective is to accelerate the R & D of advanced solar cells through the exchange of information and researchers and through the development of common evaluation methods etc. with a view to realize the early application of photovoltaics

* RENEWABLE ENERGIES.

The proposal concluded that there have been substantial international collaborative research and development activities in this field by various international agencies ; and that these existing international mechanisms were satisfactory.

...

5, rue Descartes, 75005 Paris - tél. 634-33-78

* CONTROLLED THERMONUCLEAR FUSION

The final objective of research and development work on controlled thermonuclear fusion is to bring to fruition a new energy source using practically inexhaustible universally available fuels and pos sing potential advantages from the environmental point of view. Th interest of this long term objective for the growth of world econom is obvious and the responsibility which the developed countries mus assume in this area is particularly important.

The long and expensive path leading to this objective will probably be the same for the three fusion programmes presently in progress i the United States, in the European Community and in Japan. From the technical point of view a substantial increase of cooperation betwe these three programmes whould be desirable and it is time to start discussions on this subject.

For the setting up of such a cooperation, politival determination and support from the highest political level would be essential.

FOOD TECHNOLOGY.

There is scope for research on improving the efficiency and quality of food production in OECD countries ; for research and training in Third World countries on the utilisation of raw materials, storage of agricultural produce and food wastage ; and for coordinating research on food safety.

AQUACULTURE.

A project for planning consulting and developing technologies for increased aquacultural production in cool water environment.

PHOTOSYNTHESIS.

The objective is to promote basic research on photosynthesis and photoconversion to develop artificial photosinthetic systems and to improve photosynthetic efficiency through implementation of exchange on information and researcher and promotion of mutual utilization of facilities and equipment.

HABITAT AND URBAN PLANNING IN DEVELOPING COUNTRIES.

Aim : to take into consideration problems of urban planning in developing countries.

Cooperation would concentrate on training Urban Planning Offices to enable them to apprehend technical, social and cultural problems encountered in developing countries.

FAST TRAINS.

Development of high-speed ground transportation systems utilizing both whell-on-rail and magnetic levitation technologies have reached a stage where more effective international cooperation and, especially, the preparation of first international connections are recommended.

IMPACT OF NEW TECHNOLOGIES ON MATURE INDUSTRIAL SECTORS

The project proposes a series of comparative studies of the process of rejuvenation of traditional sectors induced by new technologies.

The aim is to acquire a defined and common methodology of analysis and evaluation in terms of competitiveness and employment of this delicate process.

ADVANCED ROBOTICS.

The objective is to develop advanced robot systems, which can liberate human work from difficult activities in harsh, demanding or dangerous conditions or environments by integrating advanced new technologies.

ADVANCED MATERIALS AND STANDARDS.

The proposal aims at coordinated research activity to provide the necessary research basis for the preparation of codes and practice and standards in the field of advanced materials and in new applications of existing materials. The results of the research would be fed into the International Standards Organisation.

BIOTECHNOLOGY.

There is a need for collaborative R& D : selection of priority projects will emerge from expert meetings. There is also a need for establishing and coordinating a network of new and existing training centres to serve the needs of developing and developed countries.

ORPHAN DRUGS.

As part of the proposal for biotechnology it is proposed to promote the development of commercially non-viable pharmaceuticals.

NEW TECHNOLOGIES APPLIED TO CULTURE, EDUCATION AND VOCATIONAL TRAINING.

The project will contribute to the development of culture, education and vocational training by seeking to encourage the transferability and portability of new technologies.

It is also proposed that a collaborative program be set up for the production of didactic material for computer training and retraining of personnel.

PUBLIC ACCEPTANCE OF NEW TECHNOLOGY.

People react to new technologies in ways which reflect their attitudes and values. Relatively little is known about the factors involved, including the role of cultural differences. International co-operative studies and exchange of experience are proposed.

The following synopses have been prepared by the UK Secretariat.

FAST BREEDER REACTOR CO-OPERATION.

Considerable international collaboration is already under way, aimed at improving the commercial prospects for this technology. More can be done however, and it is recommended that Summit countries consider ways of expanding this co-operation through existing channels.

* SCIENTIFIC OCEAN DRILLING.

The study of the oceanic crust has long term implications, which are currently the subject of an international co-operative programme (IPOD). Because of the potential international benefit, broader participation of scientists from other countries is recommended, together with a wider sharing of costs where possible.

* HIGH ENERGY PHYSICS.

Experimental research into high energy physics involves extremely expensive facilities, which are likely to exceed the financial capabilities of a single nation. Thus an international co-operative programme should be considered, leading to the definition, design and construction of appropriate facilities.

* SOLAR SYSTEM EXPLORATION.

The Summit countries endorse and encourage solar system exploration, emphasising the continuation and expansion of international co-operation in this field. A prime objective

is to enhance collaborative planning aimed at the development of more cost-effective methods of conducting solar system exploration.

REMOTE SENSING FROM SPACE.

The global nature of satellite development has led to substantial international collaboration in this field. The Summit countries have demonstrated their commitment to the use of satellites for remote sensing through a number of co-operative programmes. Nevertheless, further work needs to be done, particularly in such areas as ocean sensing, meteorology and world climate, land sensing and the development of remote sensing instruments.

VERSAILLES WORKING GROUP - TECHNOLOGY, GROWTH AND EMPLOYMENT

SUMMARY OF PROJECT SUPPORT

PROJECT \ COUNTRY	CANADA	EEC	FRANCE	GERMANY	ITALY	JAPAN	UK	US
* Light water reactors		L	I		I	L	I	
* Radioactive Waste		L			L	I		
Solar Cells		I		I	L	L	I	
* Renewable energy	I	I	I	I	I	I	L	
* Nuclear fusion	I	L	I	I	I	I	I	L
Food technology	I	I	L		I	I	L	
Aquaculture	L		I	I		I	I	
Photosynthesis		I	I	I	I	L	I	I
Urban planning		I	L		I	I	I	
Fast trains		I	L	L	I	I	I	I
New Technology on mature industry	I	I	L	I	L		I	
Advanced robotics	I		L	I	I	L	I	I
Materials	I	I	I	I	I	I	L	L
Biotechnology	I	I			I	I	L	L
Orphan drugs	L	I	I		I		I	
Technology applied to education	L	I	L		I		I	
Public acceptance of technology	I	I	I	I	I	I	L	I
Fast breeder reactors		I	L	I	I	I	I	L

COUNTRY / PROJECT	CANADA	EEC	FRANCE	GERMANY	ITALY	JAPAN	UK	US
* Deep ocean drilling	I		I	I	I	I	I	L
* High energy physics	I	I	I	I		I	I	L
* Solar system explorations		I	I	I	I	I	I	L
Remote sensing	I	I	I	I	I	I	I	L

Notes:-

a) L indicates Leader or Co-Leader

b) I indicates a willingness to participate in the next stage of the project (where appropriate)

UK Secretariat

5 January 1982

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0. GENERAL INTRODUCTION

"Revitalization and growth of the world economy will depend not only on our own effort but also to a large extent upon cooperation among our countries and with other countries in the exploitation of scientific and technological development. We have to exploit the immense opportunities presented by the new technologies, particularly for creating new employment. We need to remove barriers to, and to promote, the development of and trade of new technologies both in the public sector and in the private sector. Our countries will need to train men and women in the new technologies, and to create the economic, social and cultural conditions which allow these technologies to develop and flourish. We have considered the report presented to us on these issues by the President of the French Republic. In this context we have decided to set up promptly a working group of representatives of our governments and of the European Community to develop, in close consultation with the appropriate international institutions, especially the OECD, proposals to give help to attain these objectives. This group will be asked to submit its report to us by 31 December 1982. The conclusion of the report and the resulting action will be considered at the next economic Summit to be held in 1983 in the United States of America."

Declaration of the Seven Heads of State and Government and Representative of the European Communities

Chateau of Versailles, June 4, 5 and 6, 1982

Consistent with this instruction, and at the initiative of the PRESIDENT OF FRANCE a Working Group of Respresentatives of the European Community was set up to consider the opportunities, problems and challenges presented by technology, with special regard to economic growth and employment. The Working Group met for the first time on August 20, 1982.

Operating on the basis of concensus the Working Group has produced this report which is essentially political in nature and is addressed to Heads of State and Government*. The report is selective: it concentrates on our own countries except where we state otherwise, it also concentrates on problems where science and technology offer potential solutions, but it does not pretend that science and technology provide a panacea. The Group has completed its task and hereby presents its report.

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* In this report the word Government is also taken to include the European Community.

1. IMPORTANCE OF SCIENCE AND TECHNOLOGY AS A BASIS FOR ECONOMIC REVITALISATION AND GROWTH

1.1 Historical Analysis

Two hundred years ago, James Watt's invention of the steam engine together with other inventions were to change the face of the world. In the following decades, our methods of work, our countryside, our systems of transport were all transformed. The introduction of the railway, the steamboat, and the telegraph stimulated our economies. Later, the internal combustion engine the automobile, the aeroplane, the telephone, electricity, and the chemicals industry began to change the quality and style of our lives.

This process of transformation and change stemmed from a conviction that scientific inquiry and advance is central to progress. This confidence in science, which, since the Renaissance, was popular in intellectual circles, was to spread gradually to many disciplines sich as engineering and technology and, eventually, to industry itself. This was most evident by the end of World War II, when entire sectors of our economies existed as a result of the spin-off from scientific research. The progress which resulted was substantial in the agricultural, industrial, service and public health sectors.

While science and technology were modifying our methods of work and our machines so profoundly, our organisations and institutions were also changing. Financial, trade, administrative, educational and legal systems all underwent far-reaching transformations in order to adapt to the new world that was emerging. Thus, in a thousand different ways, science and technology have penetrated the very fabric of our societies and of our lives.

Research which can start modestly in the form of a laboratory experiment or an equation written on a blackboard, can eventually lead to a vast and varied number of applications. This has been the case with fundamental research carried out on the structure of atomic muclei, which led to the discovery of nuclear energy. Research on solid state physics has radically transformed or created an immense range of products and systems such as digital watches, television receivers, video-recorders, health care equipment and many other familiar products. Space research programmes have yielded many valuable benefits in fields such as telecommunications, remote sensing, new materials, and transport systems. The theoretical understanding of the part played by nucleic acids in the transfer of genetic information arose from the discovery of DNA but also promises a vast range of applications in the field of biotechnology from health to food.

These examples of successful technological innovation have one thing in common: ideas emerging from excellent fundamental research have been developed by entrepreneurial industrialists into goods and services which meet the needs of society.

But industrialization has also created new problems: severe strains on our material resources and on our environment, fundamental changes in our life style, and increased attention to modern weapon systems. More recently, the slowdown in economic growth and increasing unemployment has coincided with some lack of public acceptance of new technologies.

At the same time we have witnessed an explosive growth of population, particularly in the developing countries, some of which have suffered from severe economic strain.

Thus, despite all mankind's achievements many problems confront the industrialized and the less developed countries today.

Major advances in science and technology have caused profound changes in our way of life for more than two centuries. These developments continue today at an even greater pace.

1.2 Future Potential

In the near term, new technologies will be diffused throughout society largely through the mechanism of competitive enterprise. Advances in information technology combined with progress in computers, video-recorders, and telecommunications can transform education, increase the efficiency of our organizations, and permit optimal use of human and material resources. Incorporation of microprocessors into existing technologies can produce a generation of new products of improved performance.

Robotics can improve the productivity of industry and free workers from hazardous and repetitive labour. The same technology can be applied to the problems of the physically handicapped to produce artificial limbs and other devices that may enable them to lead fulfilling lives.

Remote sensing can improve our capacity to live in harmony with our environment, develop our natural resources, and predict out weather. Improvements in materials can create new technologies and enhance existing

ones. The evolution of catalysis from an art to a science and improvements in membrane technology offer the possibility of new and more efficient chemical processes. Biotechnology has vast potential for the production of pharmaceutical products such as insulin, the synthesis of industrial chemicals, the development of new agricultural species and the more efficient recovery of mineral resources.

In the field of energy fast breeder reactor technology will soon offer a major increase in the efficiency of electricity generation from uranium. In the longer term, thermonuclear fusion, one of the most challenging technologies ever conceived, may offer a virtually inexhaustible source of energy from ordinary seawater.

It is vital to remember that the technologies we are applying today are founded upon the scientific research and development of yesterday. Hence the well-being of society in the next century will rest on the application of scientific research which is being carried out now.

The importance of fundamental scientific research in the birth of new industries cannot be over-emphasized. The role of government support of science to inspire the future economic and social development of our countries should be widely understood.

Finally the historical tradition in science of international cooperation and free communication, which has been so important in the past, should be continued and expanded in the future for our mutual benefit and progress.

Fundamental scientific research is the source of technological achievement in industry and should be given special support by Government.

2. THE EFFECT OF SCIENCE AND TECHNOLOGY ON THE LEVEL OF EMPLOYMENT, THE IMPROVEMENT OF LABOR CONDITIONS, AND THE ADVANCEMENT OF CULTURAL AND EDUCATIONAL STANDARDS

2.1 The Level of Employment

The problem of unemployment, and its costs in human and social terms is a major pre-occupation in our countries. For this reason the positive role which science and technology can play in increasing employment should be closely examined.

The transformation of new technological knowledge into investment in innovation is essentially a micro-economic decision for individual firms and entrepreneurs. The process is conditioned by the individual decision-makers' perception of the predicted profitability and of the economic and social environment, including the probable behaviour of government.

Thus individuals' decisions increase employment in innovative firms while causing layoffs in others. Overall, it is even possible that innovation could, at least in the initial stages, destroy more jobs than it creates.

However, through the whole period of industrial history, technological innovation has not only proved to be one of the major sources of social and economic progress, but it has also markedly increased the overall level of employment.

To outweigh the potential of job destruction from innovation by the concomitant job creation, a growth conducive micro- and macro-economic environment is essential. The existence of a stock of promising but unrealised innovations certainly favours the creation and maintenance of such an environment, as does a high degree of price flexibility and labour mobility and adaptability. However this is insufficient if public and private demand is shrinking and condifence in future growth and stability is low.

Special training programmes are necessary to promote flexibility, mobility and adaptability, especially amongst scientific and technical personnel.

2.2 Social Effects

The benefits derived from the use of new technologies can result in real progress for the worker. The implementation of new technologies in the work place can free the worker from mundane tasks that can be readily automated. Technology can infuse a new prosperity into a region and give firms an opportunity to organize more effectively for growth. There will inevitably be changes in existing structures as the result of new technologies, although these changes can ultimately not only increse the level of employment and encourage growth, but create a more human environment for the individual.

Such changes present a challenge to society which demands an effective response. First, there should be a relation between the types of technology developed and perceived social and cultural needs as well as purely economic ones - hence the need for public debate in science and technology. Second,

education and training are necessary to prepare people for technological change. Third, the initial labour displacement effects, both qualitative and quantitative need to be allowed for: careful consideration must therefore be given to the reorganisation of work as well as to policies designed to give protection to the weakest segments of the labour force, such as women and older workers.

Finally although, as we have stated, measures to increase the flexibility, mobility and adaptability of the labour force are very important, it is equally essential that a good climate in industrial relations is maintained.

The educational programmes of nations should prepare their citizens for living and participating in a society of an increasingly technical nature.

2.3 Public Acceptance of New Technologies

Developments in industrialised societies show that new technologies, often present problems of public acceptance. If a technology is regarded as unacceptably risky, threatening to the environment or to jobs, it may be resisted.

Resistance to new technology is not new. For example, in the ninteenth century, the introduction of steam cars was inhibited by the requirement that they should be preceded by a man carrying a red flag. More recently, there has been strong resistance to nuclear power and, in some cases, to new technology at the work place.

But a great many people are ambivalent in their attitude towards new technology. Those who resist new technology in the work place may accept it enthusiastically in the home. Microwave ovens, electronic calculators, video recorders and home computers are becoming increasingly familiar features of everyday life.

In many of our countries, much of the more vocal opposition comes from minority groups. Some of this opposition may be justified, some may be widely exaggerated. Some of the fears expressed may even go beyond the technical considerations into the broad area of political grievances about society's values or about democratic processes. Diagnosis of this complex subject requires an appreciation that there are many technologies, many publics, many institutions and many cultures. Although some work has been done in this area, there is little to suggest that we have any real understanding of the factors which shape public attitudes to a new technology. We need to improve this understanding if we are to derive the maximum benefit from the new technologies.

The fate of our scientific and technological innovations is largely a function of the willingness of the public to accept them. More attention to the problem of public acceptance of new technologies is needed.

2.4 Impact of New Technologies on Mature Industries

The impact of new technologies on "mature" industrial structures is most apparent in those industries which started the process of industrialisation and which, in former times, have constituted the most dynamic and

dominant centres of economic progress. In the process of economic development, the old industrial centres were particularly vulnerable to technological change in other places. Efforts by governments to protect traditional industries against structural change, whether by subsidy or by other means, can not be successful except in the short term.

On the other hand, there are clearly cases where adoption of new technologies can positively influence the development of mature industries by providing new opportunities for growth. It is industry which has the primary task of responding to the challenge of structural change: market forces will condition industry's response but social and other factors must also be taken into account. Governments, for their part, should pursue positive adjustment policies while bearing in mind future demand and supply structures and the opportunities for further technological development.

Further specific studies such as those being carried out in the OECD, should be made to determine the extent, and the methods by which science and technology can contribute to the easing of the widespread adjustment problems in some regions which are often posed by the decline of traditional industries.

Special attention should be paid to the rejuvenation of mature industries through the use of science and technology.

3. IMPLICATIONS OF SCIENCE AND TECHNOLOGY FOR THE WORLD ECONOMY

3.1 Implications of Science and Technology Policies for World Economic Activity.

In the present circumstances of high and still rising unemployment in the world, the creation of new jobs in competitive industries has become an objective of central importance to our governments. Investment in innovation can play a decisive role in reaching this objective. In addition to its direct effect on demand, there are three distinct ways in which investment in innovation can help generate the basic conditions for a return to higher economic growth and employment:

Accelerating the process of innovation will

- First, facilitate the structural adjustment of the supply sides of our economies, easing inflationary pressures related to structural rigidities.

- Second, improve cost/price ratios through productivity increases.

- Third generate an investment-led recovery, which will reduce potential supply bottlenecks and thus the risk of fresh inflation occurring before more satisfactory employment levels have been restored.

If the process of innovation is to have these effects, it is desirable that productivity gains must not be entirely distributed in the form of higher labour costs. It is also desirable that productivity gains be associated with a simultaneous increase in aggregate demand. Providing a proper distributional balance is achieved productivity gains could not only improve the overall economic outlook, but also the employment situation.

Industrial innovation is best exploited through a balance of increased productivity and increased employment.

3.2 The Encouragement of Economic Growth by the International Flow of Technologies

The international flow of technologies takes many different forms: it occurs between countries, universities, firms and individual scientists. The pattern is complicated: some links are carefully planned and organised, others occur by chance. But the result is a flow that has encouraged the birth and growth of new technologies. At government level numerous formal cooperative arrangements serve to facilitate contacts and augment already extensive informal arrangements.

Important exchanges also occur in the private sector. An open trading system encourages this flow of information which strengthens the innovative process.

Nevertheless, care must be taken by governments to control the transfer of sensitive technology, important for the national security of our countries.

The impact on the world economy of advanced technology industries can be enhanced by creating through international cooperation a climate which fosters advanced technology development, application, and exploitation. The following factors are conducive to such a climate:

- an open and competitive trading system to promote technological development by reducing trade barriers and other barriers and facilitating the cross border flow of technology in the most appropriate ways.

- compatible and, where possible, harmonized regulatory and testing systems to facilitate free trade.

- interdependence amongst the partners who, nevertheless respect each others autonomy.

Such conditions will contribute to a healthy world economy characterised by steady non-inflationary growth. This will provide the foundation for long-term social benefits.

We reaffirm our commitment to removing barriers to an open multilateral trading system and to promoting the development of trade in new technologies, especially for their role in creating new employment. We therefore seek to intensify our bilateral contacts and our multilateral contacts in all relevant fora.

An open and competitive trading system between autonomous but collaborating partners should be strengthened by harmonizing and making more compatible our regulatory and testing systems. Care must be taken to avoid the transfer of sensitive technologies of military significance to our countries.

3.2 Conditions for the Effective Utilization of Science and Technology by the Developing Countries

The contributions of scientific research to developing countries has been spectacular in a number of fields. In health, for example, years of international research has resulted in smallpox being practically eliminated. In agriculture, innovation has brought new varieties of high-yielding wheat and rice which have markedly increase the world food supplies.

The world economy as a whole can benefit from healthy non-inflationary economic growth among the developing countries. But the model of industrialisation and economic development which our countries have followed is not necessarily the one which the developing countries should adopt. It is for the developing countries themselves to establish their priorities and their policies, since it has to be recognised that simplistic and mechanical transfers of new technologies to these countries can create, at least in the short term, serious social as well as economic imbalances.

The greater part of the world's scientific resources are to be found in our own countries. There are substantial differences among developing countries, and hence there is a need for many different forms of technology transfer. Many substantial programmes are already in place while recently some new and imaginative mechanisms have been developed by some of our countries. One key element of these mechanisms is the training of researchers to enable them to work on applied research problems within their own scientific institutions in accordance with the priorities set by the own governments.

Nevertheless much remains to be done to harness the resources of science to the needs of the developing countries. We should continue our efforts to make training opportunities available to scientists and engineers from the developing countries in our universities, government laboratories and industries. In our universities and laboratories, there are already hundreds of thousands of students and post-doctoral candidates from the developing world taking advantage of these opportunities.

The question of ensuring favourable conditions for the return of these researchers to their countries of origin and their re-insertion into their countries' professional life must be given very careful attention by the developing countries as well as by ourselves. It is important that the developing countries create their own scientific and technological capacities so that each can determine its own socio-economic and cultural path.

While governments have a central responsibility for all these activities, it must be stressed that private firms, including multinational corporations, have major achievements in this field. In particular, it should be acknowledged that an increasing number of companies have adopted codes of conduct that reconcile the benefits of an active technology transfer with the need to respect the priorities established in the developing countries by their governments, and the cultural values of the countries concerned.

Science and technology are not panaceas. They are only one of the means of promoting development. It is the responsibility of the developing countries themselves to make their choices and the necessary adaptations to

the technologies they create or import. But increased efforts are needed by our govenments to understand the problems faced by developing countries in the development and exploitation of technology.

Science and technology can be applied to many of the problems faced by the developing world. As developing countries create infrastructures in science and technology, our own countries should recognise the constructive role which they are able to play, mindful that it is the responsibility of the developing countries, as sovereign nations, to establish their national policies and priorities.

4. THE ROLE OF GOVERNMENTS IN SHAPING THE SOCIAL AND ECONOMIC CONDITIONS FOR OPTIMUM IMPACT OF INNOVATION ON GROWTH AND EMPLOYMENT

4.1. Primary Responsibilities of Governments and the Public and Private Sectors*

The long-term health of our economies revolves round the ability of our governments to encourage innovation in the public sector, private industry and in our scientific research communities.

The public sector's responsibility for shaping the social and economic framework for innovation and growth is beyond dispute. Governments, or their agencies, can determine the regulatory, economic, and commercial environment within which the private sector can develop.

But governments should recognise the role of competition and of the private sector in the development of near term commercial technologies. In general, this competition in the innovation process helps to bring the best products to the consumer at the lowest price. Remembering that innovation is

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* For all countries the phrase public sector refers to Governments, in some it also extends to other activities under public ownership. For all countries the phrase private sector refers to private industry and commerce, in some the role of the private sector is also shared with parts of the public sector.

inherently risky, governments should help to create an environment which on the one hand provides a predictable regulatory framework, low inflation and interest rates and a fiscal structure which rewards enterprise and on the other hand facilitates the acceptance of new technologies in the work place and by the public more generally.

It is also important to recognize the respective contributions which the different sectors can make to the actual process of innovation. To the private sector falls the task of identifying opportunities for the productive uses of new technologies and matching applications of technology to market needs. Governments, for their part, have specific responsibilities which includeed the sponsorship of basic research, and research of far-reaching but uncertain applicability, whose social benefits may not be matched by immediate commercial returns.

The demarcation of the sectors' respective roles is not easy and depends on the individual situations in our countries: this is, in any case, less important than the establishment of workable mechanisms and a suitable climate which allows both sectors to function together in an optimal manner.

The market introduction of new technologies is primarily the task of the industrial and commercial sector. A competitive atmosphere is essential for this type of innovation since it creates a continuous evolution of technological progress and, thereby, long term economic growth. Governments should support fundamental science and long term, high risk research and development activities.

4.2 Governments' Overall Economic Policies

The overall stance of an economic policy is decisive in shaping the conditions for innovation to have a favourable impact on sustainable economic growth and the creation of jobs in competitive industries. Uncertain expectations regarding rates of inflation, exchange rates and the level of interest rates make it more difficult for investors to interpret the market signals represented by changes in relative prices while expectations of increasing labour costs are likely to favour expenditure designed to save labour.

The innovation process is helped by a low inflation, stable environment with predictable government policies. Stability, continuity of policy measures and confidence in the future encourages medium and long term investment programmes. It is this kind of environment with mobile labour forces and capital, and with a flexible response to changes in demand, technology or prices which enables an economy to be kept more easily on a path of macro-economic equilibrium and orderly expansion.

Government policies should therefore be geared to increasing micro-economic flexibility rather than hampering it, and to promoting growth through balanced macro-economic policies thereby inducing confidence to all those involved in the process of innovation.

Under present peconomic conditions, technological collaboration in areas which are promising at the scientific research level can be hampered by increasingly defensive strategies aimed at protecting market shares. The

implementation of a programme of international collaboration in the field of science and technology can contribute to, and benefit from, the restoration of expansionary non-inflationary conditions: both technical progress and employment could be favourably influenced.

Thus, while each of our governments must continue to have national responsibility for the choice of appropriate demand and supply policy mixes, greater collaboration on policies affecting innovation will hasten the return to growth.

Governments need to generate and support the framework conditions for workable competition and provide incentives for innovation through the encouragement of invention and investment in innovation.

4.3 Regulatory, Patent, Tax and Trade Policies

Governments possess a variety of instruments through which they can create a positive environment for technological innovation.

A predictable regulatory environment can promote innovation. While regulations are necessary in order to protect the rights, health and welfare of the public, a constant review of the regulatory structure is necessary in order to balance the costs and benefits.

All our governments use the patent system to give protection to innovators in pursuing and marketing their ideas. The incentive for the private sector to develop new products and processes would be diminished without such protection. But many patents arise from work under government research contracts in universities, government laboratories and industry. It is important to ensure that those who develop patentable ideas in collaboration with government, do so on the basis of clearly understood patent rights which do not impede the introduction of the new technologies into the market place.

Many countries, in addition to allowing research and development expenditure as a tax deducation, have developed special tax incentives and other forms of government assistance for innovation, due to the inherent high risk nature of research and development and it anticipated social benefits. This special assistance for the innovation process is to be welcomed.

High technology industries may pose special problems for the functioning of the world trading system, in part because of the rapidity with which changes are taking place. Government policies can stimulate the development of a competitive world market and the expansion of world trade in new technologies. For example, the development of common standards on new products will allow them to be marketed more widely. Government policies should, however, seek to avoid the creation of conditions that might lead to distortions and impediments to free and open trade flows.

[A world trade system in which governments, using the resources of their tax payers compete with each other instead of allowing independent private sector firms to do so, would undoubtedly put an end to the high efficiency and other beneficial effects which have emanated from the open multilateral trading system as it has developed since World War II.]

[Notwithstanding this general philosophy, where market forces are proved to be inadequate, for example where excessive barriers to change exist, governments should carefully explore ways to facilitate adjustments, while seeking always to enhance the overall strength of their economies.]

Governments, collectively and individually, therefore have a responsibility to minimize distortions and encourage international trade in high technology products and services

[Both the OECD and the GATT are launching work programmes to examine the trade issues which may arise in high technology products. We endorse those efforts to develop a better understanding of these issues.]

National policies in areas such as regulatory standards, tax, patents and trade all influence our ability to innovate and to reap the full benefits of innovation. We recognise and endorse the efforts of the OECD to resolve some of the problems we face in this area.

4.4 National Policies for the Promotion of Science and Technology and International Consultations on These.

Science and technology are vital components of economic activity and of society; these in turn create the conditions in which science and technology can either flourish or wither.

It is important for governments to consider policies for:

- the promotion of science and the pursuit of knowledge for its own sake
- the application of science and the development of technology
- the integration of science and technology into economic and social policies
- intenational relations in science and technology, their application and their role in economic and social policies.

The promotion of science includes support for the acquisition of fresh knowledge and of new scientific skills, for the training of young people and the retraining of older people in new skills, for the dissemination of scientific knowledge to the scientific community and the education of the general public in science. A healthy climate for basic research in all sciences is an essential element in any free, industrialised country: it is not possible to predict from which part of the spectrum of today's basic research tomorrow's technological wonders will emerge.

The application of science and the development of technology involves the generation of an economic and social climate which encourages the growth of new technologies and the regeneration of old industries through the application of new techniques. Timing is crucial in both cases and it is important to recognise that assistance may be necessary to allow major change to take place smoothly and with due regard to the human problems caused by change.

The integration of science and technology into economic and social policies is essential if science and technology are to develop in a context which is acceptable to society and if science and technology are to be allowed to make their crucial and unique contribution to the solution of economic, social and cultural problems. Only in this way can the general public recognise and welcome the beneficial effects of science and technology and overcome their natural fear of technical change.

It is neither sensible nor necessary for these policies to be developed purely on a national basis. Science itself is, and always has been international in nature. Even when international communications have been difficult, scientists corresponded with each other, exchanged research results, and debated ideas and hypotheses. This tradition among scientists has been a mainspring of scientific progress through the ages as well as a glowing example of peaceful and constructive competition to humanity as a whole. Science is now inextricably linked to technology and hence to economic and social progress. International trade and world travel have meant that no free country can develop economic and social policies in isolation from the world environment. Our countries are interdependent with respect to economic policies, employment levels and the diffusion and uses of science and technology. This interdependence can be beneficial or a cause of conflict and hence a source of strength or weakness in the future.

Taking the progress of science as our example, we propose that interdependence is more likely to lead to strength and vitality if our countries cooperate in appropriate areas of science and technology and in their application to economic and social activity. Whilst periodic consultations have taken place in the past in bilateral and multilateral meetings (for example the United Nations, OECD) we believe that these have sometimes been less effective because they failed to take account of the growing interface between technical activity and the socio-politico-economic environment.

Accordingly a new thrust and fresh political will is needed from the highest level of government if international cooperation is to take its place alongside fair competition in helping science and technology to play their unique role in the solution of the problems which currently beset the world.

Science and technology are a souce of national and international strength and can provide immense opportunities for revitilization and growth of the world economy. They should therefore be given due consideration in all policy decisions for national development and international cooperation.

5. INTERNATIONAL COOPERATION IN SCIENCE AND TECHNOLOGY

5.1 Present situation

A very large amount of cooperation in science and technology already exists between our countries: each country participates in bilateral and multilateral arrangements in a way which is too extensive to recount here in any detail, and a few examples must suffice.

Following the success of the International Geophysical Year in 1958, 30 nations signed the Antarctica Treaty which has amongst its objectives the encouragement of cooperation in scientific research in Antarctica. °This has led to major advances in the sciences of climatology, oceanography, biology and geology. In the field of medicine the World Health Organisation has stimulated cooperation in many fields of research including infectious diseases and carcinogens.

In some cases cooperation in fundamental science has led to unexpected technological developments which have proved of great economic and social value to mankind. For example the high degree of safety enjoyed by the millions of people travelling the globe by air and sea owes much to fundamental research in climatology and meteorology. Research on very accurate measurement of terrestrial distances from satellites has begun to show promise for the early prediction of earthquakes. The International Phase of Ocean Drilling of the deep sea drilling project was designed to answer fundamental scientific questions on the structure of the earth's crust but has also provided information of real value to deep sea exploration. Work on high energy physics at CERN has led to such contrasting developments as improved theodolites for tunnel construction and a positron camera for medical tomography.

These examples demonstrate how international scientific cooperation is advancing science today and how mankind has benefitted from this in fields as diverse as medicine, travel, engineering, agriculture, energy and safety. Individual research workers, scientific societies, non-government institutions and government itself have all played key roles. The future environment for scientific collaboration will depend on a continuation of their complementary activities.

In the private sector of industry, cooperation naturally tends to be more technological than scientific; collaborative agreements or joint ventures need to take account of the rules of domestic and international trade. Scientific or technological information is often proprietary and companies cooperate through licensing and cross-licensing arrangements in order to advance their technological base.

Finally, mention should be made of cooperation between the private sector and universities, an historical link but one which has new force today and has played a major role in the development of fields such as biotechnology. This collaboration will be increasingly important in the future as a stimulant for industrial innovation.

International cooperation in science and technology has demonstrated its value. Governments should continue to support cooperation, including the international scientific organisations.

5.2 The Special Relevance of International Collaboration Today

In the present difficult economic circumstances that we are all experiencing, institutions responsible for scientific and technological research could be tempted to give more attention to their own science and technology activities to the detriment of international collaboration.

That attitude should be challenged: with the present worldwide economic and social problems, there is a special and growing significance for international cooperation in the fields of science and technology, because only by such cooperation is it possible to:

- increase the effectiveness of national research work by rationalizing it and reducing its costs

- take account of the international character of certain research projects

- create a climate which permits research to be tailored to the new situations in the international market-place

- resolve jointly certain common problems and thus avoid useless duplication and promote a diversity of approach

- cope with factors such as the expanding scale of technology, the increase in development costs, and the ever greater challenges of research and development

- enhance growth and employment.

With current economic difficulties and with national budgets subject to greater constraint, it makes even more sense to cooperate internationally, in particular, in long term high risk research and development projects.

5.3 Government Policies on Science and Technology

To meet the needs for international cooperation in science and technology, Governments should incorporate within their policies, the following specific objectives:

- to encourage international science and technology exchange and the dissemination of knowledge;

- to encourage international collaboration at all levels where this is appropriate

- to seek cooperation in, and in certain cases joint operation of large scientific research installations, the cost of which is prohibitive for a single state but which are nonetheless indispensible for the advancement of science

In order to achieve these objectives, our governments should consider:

- enhancing the appropriate conditions for exchanges of knowledge (via scientific publications, for example) and of researchers. In the latter case Governments should generate conditions which will increase mobility and allow eventual reinstatement on return.

- giving increased importance to the problems of education and training, not only of the scientists themselves, but of the population as a whole, to encourage the practical application of new technologies.

- undertaking a regular evaluation of the results of scientific research in order to assess whether the planned goals have been attained and, if not the appropriate course for future action.

Already existing international cooperation in science and technology should be continued and, where appropriate enlarged. An effective exchange of ideas and researchers must be strongly encouraged.

5.4 Potential areas for cooperation

The working group has determined that it is in our common interest not only to endorse existing international cooperation undertaken, but also to refocus it in some instances to widen or change its scope.

In addition, a number of specific areas for cooperation in science and technology were examined by groups of experts, whose conclusions are included in an annex to this report. The topics for scientific and technical cooperation were selected with the following objectives in mind:

- to stimulate conditions for growth
- to encourage training and education at all levels
- to improve living and employment conditions

In order to achieve these objectives the group agreed on four criteria to be used for the selection of collaborative projects in such areas. They should

- clearly benefit from international cooperation and involve several countries in the Working Group.

- be within the public sector or within the clear responsiblility of Governments;

- represent a major step forward in science or technology if successful

- involve possible interest by the developing world.

As a result of the examination, the Group has proposed to governments a number of cooperative research projects which are listed in Section 6.

The identification of projects to adequately meet all economic and social needs and to be agreed by everybody would have required a much longer exercise than was possible for the Working Group. The choice of projects cannot therefore reflect the priorities of all delegations to the Working Group, let alone the priorities of the other countries of the world.

The cooperation begun under the auspices of this Working Group forms a solid base for future action and should continue in other relevant fora. We also recommend to our Heads of State and Governments that, bearing in mind the role that science and technology can play in improving economic growth and employment, and in stimulating culture and education, they take science and technology into account in their policy decisions and continue to include the subject on their agenda at future summit meetings.

6. COLLABORATIVE PROJECTS

The Working Group has reviewed a broad spectrum of scientific and technological issues with a view toward determining where additional international collaboration could best contribute to increased undestanding and improved social and economic conditions, not only for our own people but for all the world.

In this process, we noted that a wide range of cooperation is already underway in such important and wide-spread areas as the conquest of space, the safety of light water reactors, renewable sources of energy, and deep ocean drilling. We appreciate this work and encourage its continuation under presently existing multilateral and bilateral arrangements.

We also propose the following collaborative projects which are either new or incorporate significant re-focussing:

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10 DOWNING STREET

From the Private Secretary

SIR ROBERT ARMSTRONG

VERSAILLES WORKING GROUP ON TECHNOLOGY, GROWTH AND EMPLOYMENT

The Prime Minister has seen your minute of 20 December.

Mrs. Thatcher considers that we should continue to argue that the Group's Report should not be published before the Economic Summit. If we fail to carry the day with this argument, she would be content to follow the timetable set out in paragraph 6 of your minute.

Finally, with regard to the proposal for an expert conference in 1983, the Prime Minister would wish to know a good deal more about the arrangements before deciding whether it would be appropriate for her to open such a conference.

A. J. COLES

21 December 1982

RESTRICTED

Prime Minister ①

Agree that
(i) we should argue for no publication of the report before the Summit
(ii) if the French persist, we should accept the timetable in para. 6
(iii) you should not commit yourself to opening an expert enbreme (para. 9) until we know much more about it.?

Yes

Yes

Ref. A082/0579

PRIME MINISTER

Agreed ms

Versailles Working Group on Technology, Growth and Employment A.J.C. 20/12

Dr Nicholson briefed you on the work of this Group in his minutes of 8th and 12th October. As the Group nears the reporting stage, we need to seek your instructions on some specific aspects of the report.

2. The Versailles Declaration required the Group to report to Heads of State and Government by 31st December 1982. The next meeting of the Group will be on 21st and 22nd December, and it is clear that one more meeting in January will be necessary before the report can be completed. It will then be transmitted to Heads of State and Government by President Mitterrand.

3. The question of publication of the report and/or publication of a covering letter summarising the findings of the report has been argued within the Group and will be discussed again next week. The Personal Representatives also discussed it at their meeting on 11th and 12th December. The main argument in favour of early publication is that expert and media comment on the report will be an additional and valuable input to the deliberations of Heads of State and Government at Williamsburg. The counter-argument is that such an action will pre-empt the assessment of the report by Heads of State or Government at the Summit and devalue its conclusions. All the countries concerned except for the French and Italians have tended towards the latter argument, while reserving their positions.

4. Another consideration is maximising the impact of the report on the public and hence improving public attitudes towards science and technology and their application to economic growth and employment - a consideration which was much in your mind at Versailles. Would this be best served by publication shortly before the Summit,

so that the report would not be overwhelmed by other Summit activities and could be followed by a "second bunch" in the form of a clear supportive statement on the report by Heads of State and Government in the Williamsburg communique? Or would it be best served by release at or after the Summit, with the endorsement of Heads of State or Government in the Williamsburg communique?

5. On the whole I would favour delaying publication until the Summit, so as to give you and your fellow Heads of State or Government an opportunity of discussing it before it comes out. But as the French are keen on early publication, they will probably leak it if it is decided not to publish it until the Summit. Nothing much would be lost, and leaks might be avoided, by a decision to publish in, say, early May.

6. Thus the time-table might look as follows:

end January completion of report by Working Group

early February (i) transmission of report plus covering letter by Mitterrand to Heads of State and Government
[(ii) publication of covering letter]

early May publication of report (if it is to be published before the Summit)

late May Williamsburg (i) consideration of report by Summit
(ii) reference in Declaration to report and the views of Summit Heads on it, and publication of the report (if it has not been published before).

The square-bracketed part of this schedule is not essential but may be needed to persuade the French to accept the later publication of the report as a whole.

7. A summary of an early draft of the report and a list of "findings" and "projects" from a later version of the draft are --- attached. A full copy of this draft has been circulated to Departments for their comments prior to the December 21st/22nd meeting.

The "findings" are liable to substantial alteration at this meeting, and the UK delegation will reserve the Government's position at the meeting so that we may put before you a later draft of the report and its findings and seek your instructions for the January meeting of the Group.

8. All the projects in which the UK is involved are still in the list. They are: Materials (joint leader with the USA), Biotechnology (joint leader with France), Renewable Energy Sources, Food Technology and Public Acceptance of New Technologies. In addition the Group has supported your original comments at Versailles to the extent that the problem of public acceptance features strongly in the report itself (eg Section 2.3).

9. The UK delegation believes that there is advantage in maintaining the momentum on public acceptance, since the research which has been done for the project indicates great gulfs in our knowledge and understanding of the factors which influence public acceptance and the way these vary from country to country. It seems likely that it will be worth while to follow up the work which has been done for the Working Group with an expert Conference on the subject, perhaps later in 1983. The delegation have asked me to inquire whether you would, in principle, be prepared to open such a Conference.

RCA

ROBERT ARMSTRONG

20th December 1982

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Versailles Economic Summit
Working Group on Technology.

June 1982.

VERSAILLES WORKING GROUP ON TECHNOLOGY, GROWTH AND EMPLOYMENT

OUTLINE OF GENERAL REPORT (Based on 2nd draft)

0.1 General Introduction

This short section quotes the declaration of Summit leaders in June 1982 establishing the Working Group, and tasking it to report by 31 December 1982.

1 Importance of Science and Technology (S&T) as a basis for Economic Revitalisation and Growth

1.1 Historical Analysis

This sets the scene, by quoting some examples from history, in which technology has changed the traditional way of life.

1.2 Future Potential

The current problems of industrialised countries are touched upon, including energy, raw materials, and environmental aspects. Technology may be able to help to overcome some of the current difficulties, but only if it is intelligently applied.

2 The Role of S&T on Employment, Labour Conditions and Cultural and Educational Standards

2.1 The Level of Employment

Technology may in the short term reduce the level of employment. In the longer term, productivity growth is likely to enhance job prospects.

2.2 Social Effects

Technology can improve social conditions, but it may also introduce problems of its own. Mention is made of particular technologies, and their possible effects on society.

2.3 Public Acceptability of New Technologies

This section introduces the theme of the UK paper on the subject. Public attitudes vary, depending on a number of interrelated factors. Frank and open debate can lead to enhanced acceptance, through improved understanding of the issues involved.

2.4 Impact of New Technologies on Mature Industries

This is also the theme of a later paper. The structure of industry is dynamic, with growth and decline occuring simultaneously. New technology has a part to play in reviving dying industries, as well as generating new ones.

3.0 Implications of S&T for the World Economy

3.1 International Flow of Technology - Encouraging Economic Growth

A slightly contentious section which advocates a healthy world economy, an open trading system and the elimination of trade and other barriers as a means of promoting the international flow of technology, and its subsequent impact on industry.

3.2 Conditions for the Effective Utilisation of S&T by the Developing Countries

The needs of the developing world frequently differ from those of Summit countries. Training is a big element in the up-take of technology. However, problems can arise which need to be tackeld with understanding and sympathy.

4.0 Role of Governments in shaping the Social and Economic Conditions for Optimum Impact of Innovation on Growth and Employment

4.1 Primary Responsibilities of the Public and Private Sectors

Another contentious section which considers the responsibility of the public sector in shaping social and economic conditions for growth.

4.2 Overall Economic Policies

This covers regulatory, patent, tax and trade policies. It is suggested that innovation thrives during a period of stability. Factors such as inflation, high interest and fluctuating exchange rates are obstacles to successful innovation.

4.3 National Policies for Promotion of S & T and International Consultation on these

It is argued here that the complexity and cost of major S&T programmes, and their interaction with the economy suggests the need for an integrated approach in drawing up national science policies.

5.0 International Co-operation in S&T

5.1 Present situation

Examples are given of successful international collaboration, and the social and economic benefits arising therefrom.

5.2 The need to Improve Such Co-operation

The advantages of co-operation are discussed, being especially beneficial during times of economic recession.

5.3 International Implications of National S&T Policies

A number of aims of an international nature are proposed, for incorporation by Governments into their overall science policies. This is seen as a means of enhancing international co-operation for overall benefit.

6.0 Criteria for Proposed Action

The foregoing sections have been used as a basis for establishing six criteria for selecting specific topics for international collaboration. The criteria are listed in this section.

7.0 Potential Topics for Co-operation

Some twenty topics have been selected by the Working Group, leading to proposals for international collaboration. The topics cover a wide spectrum of technical areas, and they are listed in this section. Considerably more detail on individual proposals will be included in an Annex.

8.0 Conclusions and Recommendations

Several conclusions have emerged from the paper, and these are listed here. A number of recommendations follow, which are addressed to Summit Heads of State. (The Conclusions and Recommendations in particular are still the subject of considerable discussion within the Working Group, and changes are likely to the current draft.)

7. POTENTIAL TOPICS FOR COOPERATION

In order to give form to the working gorup's ideas, a number of topics for cooperation in science and technology were examined by groups of experts, whose conclusions are included in an annex to this report. The topics for scientific and technological cooperation were selected with the following objectives in mind:

- to stimulate the conditions for growth.
- to encourage training and education at all levels
- to improve living and employment conditions

7.1 Conditions for growth

7.1.1 Energy

Safety of Light Water Reactors

Radioactive Waste Management

Breeder Reactor Design

Solar Energy

Other Renewable Sources of Energy

Fusion

7.1.2 Food

Food Technology

Cold Water Aquaculture

7.1.3 Basic Science and Technology

Deep Ocean Drilling

High Energy Physics

Solar System Exploration

Photosynthesis

7.2 Living and Employment Conditions

7.2.1 Better Living Conditions

Urban Planning

Remote Sensing

High Speed Trains

7.2.2 Better Industry and Employment Conditions

Advanced Robotics

Advanced Materials and Standards

Impact of New Technologies on Mature Industries

Biotechnology

Orphan Drugs

7.3 Training and Education

- Application of new technologies to culture, training and education.
- Public acceptability of new technologies.

8. Findings

- Science and technology are a source of national and international strength and should, therefore, be given due consideration in all policy decisions for national development and international cooperation.

- Science is expanding. Our quest for knowledge, its utilization, and its diffusion should continue. An effective exchange of ideas and researchers must be guaranteed.

- Our research, educational, and training systems need long-term support, but should, at the same time, be enabled to meet the challenges of quickly changing requirements.

- The contribution of science and technology to economic growth and employment depends upon the integration of our relevant policies with our economic, political, and social goals. Economic policy planning and science and technology policy decisions are to be more consistent with each other.

- The fate of our scientific and technological innovations is largely a function of the willingness of the public to accept them. More attention to the problem of public acceptance of new technologies is needed.

- (The introduction of new commercial technologies is primarily the task of the private sector. A competitive atmosphere is essential for this type of innovation since it alone creates a continual evolution of technological progress and, thereby, long-term economic growth.)

- Governments are to guarantee the framework conditions for workable competition and - at the same time - incentives for innovation primarily through the protection of inventions and innovative investments.

- National policies in areas such as regulatory standards, tax, patent, and trade influence our ability to innovate and to reap the full benefits of innovation. (We recognize and endorse the efforts of the OECD and GATT to resolve problems we face in this area.)

- Science and technology can be applied to many of the problems faced by the developing world. As developing countries create infrastructures in science and technology, we should recognize the constructive role which we are able to play, mindful that it is the responsibility of these sovereign nations to establish their own national policies and priorities.

- As we face economic difficulties, and as national budgets become subject to greater constraints, it makes even more

sense to coordinate internationally our efforts, in particular, in long-term, high-risk research and development projects. Therefore, the already existing international cooperation in science and technology should be continued and, if possible, enlarged. In addition, new topics for further cooperation should be considered. For this, the fine work which has begun under the auspices of this working group and the activities discussed in Section 7 form a solid base.

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10 DOWNING STREET

From the Private Secretary

DR. NICHOLSON

WORKING GROUP ON TECHNOLOGY, GROWTH AND UNEMPLOYMENT

The Prime Minister has seen your minute of 12 October. In the light of the considerations which you put forward, Mrs. Thatcher is content with the approach to the Working Group which is described in paragraph 14 of your minute of 8 October.

I am copying this minute to Richard Hatfield (Cabinet Office).

A. J. COLES

15 October 1982

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(1).

W.0631

Prime Minister 12 October 1982

In the light of this minute are you content with the approach described in para. 14 of Dr. Nicholson's minute of 8 October (flag A)? Yes

A.J.C. 12/10.

PRIME MINISTER

WORKING GROUP ON TECHNOLOGY, GROWTH AND EMPLOYMENT

I have some further information which I hope will answer the questions you raised on my minute of 8 October.

2. On Materials, we have excelled in this subject although, as in other areas, we have often failed to reap the commercial rewards of our technical excellence. Micro-alloyed steels (British Iron and Steel Research Association), carbon fibres (RAE, Farnborough), silicon nitride (Newcastle University and Harwell), alkali-resistant glass fibre for reinforced concrete (Building Research Establishment and Pilkingtons), liquid crystals (RSRE, Malvern), gas turbine materials (Rolls Royce and the special steels industry) and, most recently, ductile cement (ICI) are all areas where we led the world. We also have many excellent pure research groups in this field in our Universities and Research Establishments.

3. Our past and current track record in Materials R & D is substantially better than any other European country or Japan - only the USA, with vastly greater resources, has equalled the UK performance. In this connection it is interesting that the USA has now asked to 'co-lead'* with us on this subject in the Versailles Working Group. To indicate the importance they place on the subject of Materials, they have drawn our attention to a recent report from President Reagan to Congress which starts with the words "The entire materials cycle is a fundamental component of economic production and technological innovation".

4. The commercial advantage in taking the lead in Materials stems from the importance of new materials in allowing cost reductions, improved technical performance and superior design over the whole

*The Working Group allows for 'leadership' in projects by single countries and 'co-leadership' where two or more countries have a strong interest in the project.

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range of manufactured products. The current lack of agreed standards, test procedures etc prevents the European Community, let alone the world, being taken as a single market for a new product involving the use of new materials. Removal of these obstacles will encourage enterprise by helping firms who want to use new materials in their products and allow UK companies to benefit preferentially from materials innovation in this country.

5. On Biotechnology, we have requested 'co-leadership' with the French. The Department of Industry is developing a strategy to ensure that the outstanding UK achievements in this field have a proportionate influence in the outcome of the project study.

6. On the general outcome of the Working Group, the French started with the substantial advantage of President Mitterrand's report to the Summit and the Chairmanship of the Group. I completely understand that the only acceptable form of final report is a much more balanced and realistic view which fully satisfies UK interests. We have taken the initiative in guiding the thinking of the Working Group in this way and have been supported particularly by the Germans and the Americans. We have already made substantial progress in removing French self-interest and idiosyncracy and are having a 'trilateral' with Germany and the USA tomorrow night before Thursday's meetings to plan our future strategy.

7. On the developing countries, their interests have not been a major topic for discussion so far. My comment was simply intended as an assumption that the UK would not wish to be isolated from any general lip service to the needs of developing countries which may be included in the final report.

8. I hope this further information is of some help.

RBN.

ROBIN B NICHOLSON
Chief Scientist

cc: Sir Robert Armstrong
Mr Gregson
Mr Sparrow
Mr Roith
Mr Stone

Cabinet Office
12 October 1982

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10 DOWNING STREET

From the Private Secretary

DR. NICHOLSON

Working Group on Technology, Growth and Employment

The Prime Minister has seen your minute of 8 October in which you sought her views on the approach which the UK delegation is adopting in the Working Group.

Mrs. Thatcher has commented as follows: "I have the feeling that we are once again losing out to the French and that the objective of the working party has now been changed by them to facilitate some of their own projects in the guise of "co-operation". We must not be taken along this road. At present, I am not happy with our own choice of subject. We do not excel in it sufficiently".

The Prime Minister also made one or two marginal comments on your minute. With regard to paragraph 6(d), she minuted that our positive attitude to the working party's activities, and our support for the French chairmanship, must depend on their acceptance of our own objectives. Mrs. Thatcher also queried the reference to maintaining "a positive position where the studies of the Working Group relate to developing countries".

The Prime Minister expressed doubt as to whether, as your paragraph 12 suggests, there would be significant commercial advantage to the UK in taking the lead in stimulating trade and use of new materials.

On paragraph 13, the Prime Minister commented that she did not like the idea of France leading in the field of biotechnology when most of the fundamental research had been done in this country.

You may wish to let the Prime Minister have further advice in the light of the above comments.

I am copying this minute to Richard Hatfield (Cabinet Office).

A. J. COLES

11 October 1982

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(1)

Prime Minister

Content with the approach described in paragraph 14?

A.J.C. 8/10

W.0625

PRIME MINISTER

WORKING GROUP ON TECHNOLOGY, GROWTH AND EMPLOYMENT

At the Versailles Summit Heads of State and Government agreed to set up a Working Group of representatives of their Governments and the European Community to report on Technology, Growth and Employment by 31 December 1982. The Declaration refers to the Working Group being set up "in the context of" the Report presented at the Summit by President Mitterrand and states that the conclusion of the Report and "the resulting action" will be considered at the 1983 Economic Summit.

2. The Working Group met twice in August and September and meets again at the end of next week. Three further meetings are scheduled in November and December. I have been joined in the UK delegation by Mr Roith, Chief Engineer and Scientist in the Department of Industry and by representatives from the FCO and our Embassy in Paris. The meetings have been chaired by the French, generally by the French Sherpa, Attali.

3. A recurring theme in the discussions has been cooperation between countries. This theme does appear in the original paper by M. Mitterrand and "cooperation in the exploitation of scientific and technological development" is specifically mentioned in the Declaration. However, by the time of the first meeting of the Working Group, cooperation, especially in scientific and technological development and in the creation of new institutions, was becoming an end in itself. The UK delegation has repeatedly emphasised the need to return to the major theme of the Working Group, namely the harnessing of technology for growth and employment. We have received strong support from the German delegation in this task.

4. The French, from the Chair, have been pushing strongly for "concrete projects" to be agreed by the Working Group and on which action would be taken immediately following the Working Group's report. This is a literal interpretation of the Declaration but most other delegations have taken the view that the report should be considered by Heads of State and Government before implementation.

5. The French, uniquely amongst the nations represented, are expanding their national R & D expenditure and their desire for "concrete projects" could well be related to this. M. Mitterrand has also shown a strong personal interest in this. All other delegations, either privately or in public, have indicated that they do not anticipate allocating significant new resources to implementing the proposals of the Working Group, although they would be prepared to re-allocate existing resources.

6. Following inter-Departmental discussion, the objectives of the UK delegation in the discussions of the Working Group have been as follows:

(a) To ensure that discussions are focussed on the theme of the harnessing of technology for economic growth and employment;

(b) to develop your own suggestion that the Working Group should consider how public opinion could be influenced to welcome and not fear the arrival of new technology;

(c) to take our share of leadership in preparatory work for projects and Working Group meetings;

(d) to maintain a positive attitude to the Working Group, supporting the French chairmanship as far as possible;
- provided it upholds our objectives

(e) to maintain a positive position where the studies of the Working Group relate to developing countries.?

7. On (a) we have continued to stress the prime importance of the role of the private sector in the exploitation of science and technology for economic growth, with the role of Governments

limited to creating the right climate for innovation, removing barriers to the exploitation of technology, and providing resources for appropriate education, training and basic research. This view has received broad support in the Working Group, especially from the German and American delegations.

8. On (b) and (c) much of the discussion of the Working Group to date has been based on proposals for projects or studies on specific areas of science and technology and its exploitation. About 25-30 proposals have been made, of which the United Kingdom has been responsible for four, as follows:

(a) Public acceptance of new technologies. We are suggesting case studies on the acceptance/non-acceptance of new technologies in various countries, leading to an identification of the factors which are most likely to influence public opinion towards the acceptance of new technologies. These lessons could then be applied to technologies which are presently being introduced, such as information technology and biotechnology;

(b) Materials, where we are suggesting that new materials are frequently the key to developing new technologies, and that the rapid use of new materials in international markets is currently hindered by the incompatibility of national standards in metrology and the manufacture, testing and service performance of new materials;

(c) Renewable sources of energy, where we are suggesting that the availability and cost of energy can hinder growth through the use of technology and that the exploitation and commercial use of currently-available technology should be promoted;

(d) Food technology, where we are suggesting that the limiting factor in the use of the vast improvements that have been made in agriculture is the technology of food production and use and hence the balance of work should be shifted from agriculture towards food.

9. A complete list of the projects currently under examination by the Working Group is attached in the Annex. The subjects are very wide-ranging and the relation of some of them to economic growth and employment is tenuous to say the least. This problem has arisen because of the preoccupation of some delegations with cooperation for its own sake.

10. The number of projects which are finally included in the recommendations of the Working Group will represent a reduction to at least half of the current list. We believe that the UK interests will be best served if the projects on public acceptance of new technologies, and materials, appear in the final report.

11. In our proposal on public acceptance of new technologies we will use the significant academic work in this field in the UK and also the work of the recently-formed Technical Change Centre.* The most likely outcome is an increased recognition of the importance of work in this field and more attention to international comparisons. Any additional costs consequent on maintaining UK leadership in this area will be small and could probably be met by re-allocation within the Science Vote.

12. In the proposal on materials we propose to use the world-wide reputation of the National Physical Laboratory but also to bring in the specific expertise of a number of other Government and independent research laboratories. We believe that there would be significant commercial advantage to the UK to take the lead in stimulating trade and use of new materials. There may be a need for additional resources for the NPL on a pump-priming basis.

13. A number of the other countries have in mind proposals which would make one of their own institutions the leader in a particular field - for example, Italy has made a proposal in the field of solar energy, France in biotechnology, Germany in High-speed ground transport, and the USA in some areas of basic science. We believe that the choice of materials as an area for the UK is a good one because it is a generic technology which influences and stimulates

* Jointly funded by the Leverhulme Trust, the Science and Engineering Research Council and the Social Sciences Research Council.

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many of the other technologies which are being considered by the Working Group.

14. So far it has been possible for the UK delegation to reserve its position on all the substantive issues before the Working Party. However, at the next two meetings it will be necessary to state our position and I would thefore ask for your views on whether or not our approach is correct in the following key areas:

(a) Our generally positive attitude to the whole exercise while being tough on the need to stick to what we see as the original remit of the Working Group; and on the key role of the private sector;

(b) our proposal to bid for leadership in the areas of public acceptance of new technologies, and materials, and to be prepared to put the necessary resources into these if we are successful in our bid;

(c) to use the Working Group to stimulate the effective operation of existing institutions and international agencies rather than to create new ones.

RBN.

ROBIN B NICHOLSON
Chief Scientist

cc: Sir Robert Armstrong
Mr Gregson
Mr Sparrow
Mr Roith
Mr Stone

Cabinet Office
8 October 1982

I have the feeling that
Once again we are going out to
the French and that the objective of
the Working Party has now been changed
by them to help out with some
of their own projects in the guise of
'co-operation'. We must not be taken along
this road. At present I am not happy with
our choice of subject. We do not need it sufficiently

ANNEX

	Leaders, Co-leaders	Interests
- Nuclear Fusion	EUROPE (EC)	Japan, Italy, France
- New and Renewable Sources of Energy	GREAT BRITAIN	Canada, Japan
- Solar energy	(JAPAN (ITALY	Europe (EC)
- Biogaz		France, Europe (EC)
- Research on Safety of Light-water Reactor	(ITALY (JAPAN	France, Europe (EC)
- Biotechnology	FRANCE	Japan, UK, Germany, Europe (EC)
- Pharmaceutical products	CANADA	UK
- Photosynthesis	JAPAN	UK, France, US
- Food technology	GREAT BRITAIN	Canada, Europe (EC)
- Aquaculture	CANADA	US, UK, Germany, Europe(EC)
- Disposal of radioactive waste	EUROPE(EC)	Italy, UK, Japan, France
- Robotics	(FRANCE (JAPAN	UK, US(?), Germany, Canada, Europe(EC)
- Public acceptance of new technology	GREAT BRITAIN	Europe(EC), Germany, Italy, France
- New technology applied to culture, education and professional training	(FRANCE (CANADA	Europe(EC), UK
- Computer-assisted translation	EUROPE(EC)	
- Fast trains	GERMANY (FRANCE ?)	Europe(EC)
- Fast Breeder Reactor	UNITED STATES	Japan, UK, Germany, France
- High energy physics	UNITED STATES	Japan, France, Canada, Germany
- Materials	GREAT BRITAIN	France, Italy, US
- Deep ocean drilling	UNITED STATES	France, UK, Germany, Japan
- Planetary exploration	UNITED STATES	Germany, UK, Japan, France
- Global habitability	UNITED STATES	UK
- Remote Sensing by satellite (Training, Climatology, Pollution)	EUROPE(EC)	UK, Canada, Italy, Japan, France.

HL

SIR ROBERT ARMSTRONG

Versailles Summit: Working Group on Technology

I attach a copy of a message which I have just received from M. Attali, via the French Embassy.

I think you may already have informed M. Attali that Dr. Nicholson will represent us on this Group. Could you please confirm this and let me know whether you wish me to say anything else in my reply to M. Attali.

JOHN COLES

12 July 1982

Please note that RTA's office dealt with reply

AMBASSADE DE FRANCE
LONDRES

10th July 1982

N° 759-

Dear Mr. Coles,

The Embassy has just received the text of a message addressed to you by Monsieur Jacques ATTALI, Conseiller spécial auprès du Président de la République.

I enclose it herewith.

Yours Sincerely,

J. Kraitsowits

Jeannine KRAITSOWITS
Second Secretary

Encl.
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John COLES, Esq.,
Prime Minister's Office
10 Downing Street
London SW1

M E S S A G E

Objet : Suites du Sommet de Versailles : Groupe de travail sur la technologie, l'emploi et la croissance.

"La première réunion du groupe de travail chargée de présenter des propositions en vue d'utiliser les progrès scientifiques au service de la croissance et de l'emploi aura lieu au Centre de Conférences Internationales, 19 avenue Kleber, le mardi 20 juillet de 10h à 17h, salle 4.

Elle permettra de définir le cadre de travail ainsi que le calendrier des travaux de groupe.

Je vous demande de m'indiquer, le plus rapidement possible, le nom de la personnalité qui représentera votre pays.

Je pense qu'il serait souhaitable d'envisager dès à présent qu'une seconde réunion puisse avoir lieu vers le milieu du mois d'Août et une troisième dès le début Septembre.

Comptant sur une réponse rapide de votre part et vous en remerciant à l'avance je vous envoie toutes mes amitiés.

ATTALI"

Inct Part

MR. WRIGHT
CABINET OFFICE

VERSAILLES ECONOMIE SUMMIT:
WORKING GROUP ON TECHNOLOGY

Thank you for your minute of 2 July. Given the views of the French Government, the Prime Minister agrees that Dr. Nicholson should be nominated to represent the United Kingdom on this working group.

A. J. COLES

6 July 1982

Prime Minister

Given the views of the French government, agree that Dr. Nicholson should do this?

A.J.C. 2/7.

Ref. A08901

MR COLES

Versailles Economic Summit: Working Group on Technology

In your minute of today's date you reported that the Prime Minister had suggested that the Minister of State in the Department of Industry, Mr Kenneth Baker, should be nominated to represent the United Kingdom on this working group and that he could be assisted by Dr Nicholson.

2. Sir Robert Armstrong has spoken to Monsieur Attali, the Personal Representative of President Mitterrand, about the level of representation on the working group. Monsieur Attali has confirmed that the French Government expect representation to be at high official level and not at Ministerial level. In the light of this information, Sir Robert thinks that it would be inappropriate for the United Kingdom to be represented by Mr Kenneth Baker, and he hopes that the Prime Minister will agree that Dr Nicholson should take part in the deliberations of the working group as proposed.

D J WRIGHT

2nd July 1982

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MR. WRIGHT

VERSAILLES ECONOMIC SUMMIT: WORKING GROUP ON TECHNOLOGY

The Prime Minister has seen Sir Robert Armstrong's minute of 29 June recommending that Dr. Robin Nicholson be nominated to represent the United Kingdom on the Working Group. The Prime Minister is inclined to think that we should nominate Mr. Kenneth Baker who could be assisted by Dr. Nicholson.

AJC

2 July 1982

(1)

Prime Minister

Agree that Dr. Nicholson should be nominated?

I think Kenneth Baker agrees. Dr. Nicholson A.J.C. 30/6.

Ref. A08864

PRIME MINISTER

The declaration of the Versailles Economic Summit announced the decision of Heads of State or Government to set up a working group on technology, employment and growth in the light of the report prepared by the President of the French Republic.

2. I have now had a message from the French President's Personal Representative, asking whom you wish to nominate as the United Kingdom member of this working group.

3. The President of the Republic has asked Monsieur Attali himself to represent France, and he will be in the chair. He will be assisted by Professor Francois Gros, Special Adviser to the French Prime Minister on scientific questions and Director of the Pasteur Institute in Paris.

4. I should like to recommend the nomination of Dr. Robin Nicholson, Chief Scientist, CPRS, to represent the United Kingdom on the working group. Dr. Nicholson will be happy to serve, if nominated.

RtA

ROBERT ARMSTRONG

29th June, 1982

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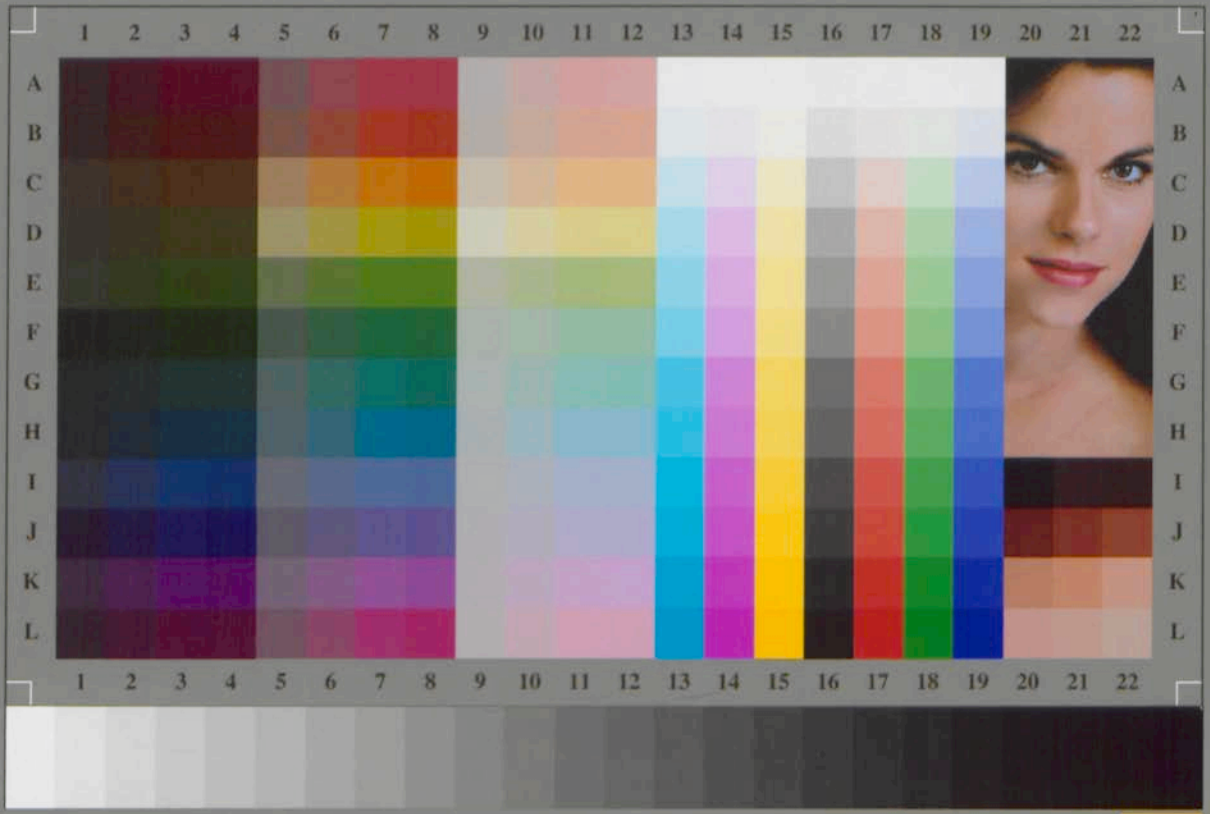

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