



2 MARSHAM STREET
LONDON SW1P 3EB
071-276 3000

My ref:

Your ref:

Charles Powell Esq
Private Secretary to
The Prime Minister
10 Downing Street
LONDON
SW1A 2AA

1 November 1990

CP 21X

Dear Charles

Thank you for your letter of 31 October enclosing a revised version of this speech.

The only significant comment that we have on it relates to pages 6-8. In our view these pages overstate the scientific uncertainty arguments, and provide too much ammunition for those who argue that it is premature to take any action now.

I enclose a suggested redraft of page 7 and the top of page 8. The main changes are to respond to some of the arguments about the carbon cycle, and also to omit the references to oxygen depletion concerns. We assume these stem from the recent lecture by Professor Dyson of Princeton University. His claim that fossil fuel burning is leading to a 13ppm per year rate of oxygen depletion is not unchallenged. But even if the figure is right, it is insignificant - it represents a change of less than 0.01% a year. And his concerns about low oxygen concentration in the Pacific may be misplaced also - it has long been recognised in oceanographic circles that the Pacific contains less oxygen, because of the prevailing oceanic circulation. I enclose a letter from NERC which explains this in more detail.

I am also enclosing a copy of the speech with a few other suggested changes.

Yours
Phillip

PHILLIP WARD
Private Secretary



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U.K. GLOBAL ENVIRONMENTAL RESEARCH (GER) OFFICE

26 October 1990

Mr D Warrilow
Global Atmosphere Division
DoE
Romney House
43 Marsham Street
London SW1P 3FY

Polaris House
North Star Avenue
Swindon SN2 1EU
United Kingdom
Telephone Swindon (0793) 411500
Direct Line Swindon (0793) 411734
Telex 444293 ENVRE G
Facsimile (0793) 411691
Head:
David A Brown

Dear David,

TIMES ARTICLE 12 OCTOBER: "OXYGEN DEPLETION A SERIOUS THREAT TO GLOBAL ECOLOGY"

You will be aware that Alan Apling approached NERC for some background about this article. Via colleagues in NERC I have been able to get a copy of the transcript of Professor J Freeman Dyson's lecture which I enclose together with copies of entries in "Who's who" etc. Unfortunately Fig.1 is missing from the transcript.

You will immediately note that what appeared in the "Times" is a small part of a much longer lecture articulating Professor Dyson's views as to the whereabouts of the missing carbon sinks. He refers to the current debate as to whether the major sink is oceanic or terrestrial and quite rightly points out that this is still far from being resolved. Under the section "New evidence" he refers to the recent paper by Tans et al. The thesis promoted in Tans paper is that if the sink is biospheric it must be mainly in the Northern hemisphere and if oceanic it must be mainly in the Southern Ocean. However recent, but limited observations, within the Biological Ocean Flux Study (the UK contribution to the Joint Global Ocean Flux Study) indicate that the Northern Oceanic sink may be much greater than anticipated. So much so that if the Northern Pacific acts in the same way as the area of the BOFS study (North Atlantic) it may not be necessary to postulate any land sinks to get the global budget to balance!

The thrust of the "Times" article, oxygen depletion, is where the author goes a little overboard and is a little alarmist. Reference to oxygen depletion in the Pacific Ocean shows some ignorance of oceanographic processes. It is well recognised in oceanographic circles that the Pacific has less oxygen. This is because oxygen-rich, bottom water from the Antarctic has been half way round the world before it reaches the surface in the Pacific and has therefore been depleted naturally. There will also be spatial and seasonal variability.

Generally the lecture makes some useful points eg. the need for more observations, rather than too much reliance on models, as a prerequisite for increasing understanding of processes. It could have made a little more of the current and proposed international initiatives within programmes such as IGBP, since some of his comments make it appear that little or no work is underway.

I hope that these points are helpful but please do not hesitate to contact me if you need any further information.

Yours sincerely

DAVID A BROWN



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uncertainties and doubts remain. No-one can yet say with certainty - the IPCC report is very careful on this point - that it is human activities which have caused the recent increase in global average temperatures. The 18 million tonnes of carbon dioxide reaching the atmosphere each year from human sources may sound insignificant compared with the 600 million tonnes from natural sources. But we do know that the increases in atmospheric concentrations of carbon dioxide date from the start of the world's industrialisation. And we know that those concentrations will continue to rise if we do not act.

Virtually all scientists believe that these increases will lead to climate change. We do

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not know precisely the extent of the likely warming in the next century, nor what the regional effects will be. We cannot be sure of the role of clouds. There is a continuing mystery about how atmospheric carbon, including some of the extra contribution from human sources, is absorbed: is most of it going into the ocean, as used to be thought, or is it feeding trees or plants, or soils, especially in the northern hemisphere? These are questions that need answers sooner rather than later, because they will determine our continuing response.

Global climate change within limits need not by itself pose serious problems - our globe has ...

unchanged, pumping out life-giving oxygen into the atmosphere and mopping up carbon dioxide.

The real dangers arise ^{because} ~~when~~ climate change is combined with other problems of our age, such as the population explosion and consequent deterioration of soil fertility; increasing pollution of the sea; and when we use up the stored sunlight which is fossil fuel and cut down the world's forests, particularly those in the tropics. X

Britain will continue to play a leading role in trying to answer the remaining questions and to advance our state of knowledge of climate change. This year, we have established in Britain the Hadley Centre for Climate Prediction and Research for this purpose. We



The need for precautionary action

But the need for more research should be no excuse for delaying much needed action. There is already a clear case for precautionary action at an international level. The IPCC tells us that we cannot repair the effects of past behaviour on our atmosphere as quickly and as easily as we might cleanse a stream. It will take, for example, until the second half of the next century, until the old age of my grandson, to repair the damage to the ozone layer above the Antarctic. Some of the gases we are adding to the global heat trap will endure in the ^{Earth's} ~~upper~~ atmosphere for just as long. X

The IPCC tells us that, on present trends, the earth will warm up faster than at any time



replant the forests which we consume; sensible to re-examine industrial processes; sensible to tackle the problem of waste. I understand that the latest vogue is to call them 'no regrets' policies. Certainly we should have none in putting them into effect.

And our uncertainties about climate change are not all in one direction. (The margins of error, in the IPCC report, is very honest about, are admittedly great.

Climate change may be less than predicted. But equally it may occur more quickly than the present computer models suggest. Should this happen it would be doubly disastrous were we to shirk the challenge now. I see the adoption of these policies as a sort of premium on insurance against fire, flood or other disaster. It ^{must} ~~may~~ be cheaper or more cost-



effective to take action now than to wait and ^{find}
^{we have to} pay much more later. This message has already
reached some of our big companies, for instance
who are finding substitutes for damaging
chemicals and building off-shore oil platforms
higher above the surface of the sea.

The need for environmental diplomacy

We are all aware of the immense challenge. The
enormity of the task is not a matter for
pessimism. The problems which science has
created science can solve provided we heed its
lessons. Moreover, we have already established
a structure of international co-operation on
the environment to deal with ozone depletion.
For the first time ever, rich and poor nations
alike set out together to save our planet from
a serious danger. This painstaking work,

