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Office, we believe it is necessary to stress the need for there to be good, accurate, timely weather information available to pilots, particularly those of civil aircraft, *at the site of their take-off and landing* in order that they may operate in safety. With a continuing move towards automation and away from observation of the weather by 'professionals' who permanently have an eye on changes in the weather, it is clear that the safety of aircraft will be compromised. Despite the great advances in technology seen in recent years, there is no equipment yet available which can replace a human observer of weather conditions at and in the immediate vicinity of an airfield. Furthermore, the reduction of observed and reported information to a minimum, as currently implied, will reduce the quality of forecasts produced for a growing number of customers of the expanding industry of weather forecasting.

The report on the crash of a Boeing 737 at Willenhall, Coventry (Air Accidents Investigation Branch 1996), in 1994 clearly demonstrates the need for pilots to receive weather information quickly after it is observed and regularly on approach to landing, especially in poor weather. The poor visibility around Coventry Airport at the time was a contributing factor in the fatal crash, but the failings of the current system of observing at airports where Meteorological Office staff *do not* do the weather observations was also expressed.

We believe that the Civil Aviation Authority, currently the meteorological authority for aviation in the United Kingdom, should give more thought to the true costs likely to accrue from reductions in the level of information from the Meteorological Office. Perhaps the UK Government should also urgently consider the transfer of authority for meteorology for aviation to the Meteorological Office, the only proper arbiters of the weather.

## References

Air Accidents Investigation Branch (1996) *Aircraft Accident Report 1/96*. Report on the accident to Boeing

737, 7T-VEE, at Willenhall, near Coventry on 21 December 1994, HMSO, London  
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## No. 1 Met. Radar?

Mr Goodall's "No. 2 Met. Radar" (*Weather*, 52, pp. 53-55) was most interesting. Dare I suggest (others may know otherwise) that No. 1 Met. Radar could well have been the one I was instructed to make functional at RAF Palam (Delhi) in 1946 - though it did not have such an exalted title as that then. Mr Goodall's description of the No. 2 Met. Radar unit is exactly identical to the Palam set.

Although I have little detailed information on the origin of the Palam GL Mk. 3 ('Gunlayer, Mk. 3' to give it its full title) I was given to understand it was one of two located on the Cocos Islands. Sometime about 1944, under the threat of a Japanese invasion, one was dumped into the sea and the other evacuated to India. Unfortunately, in the rush, the operation manual also went overboard into the sea! The result of this was a start from absolute scratch at Palam. No one in India apparently knew even how to switch it on!

Eventually a replacement manual arrived from England and it is to the great credit of the two quite dedicated radar mechanics assigned to the job that they got it going in just two weeks. This was in spite of having to grapple with virtually non-monsoon-proofed electronics.

On 2 September 1946 AHQ Delhi received its first useful radar pilot-balloon ascent to over 20 000 ft.

Chester

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## Viewpoint

### In search of a language that connects\*

There is a need to connect the efforts of the research community working to understand our changing planet with the day-to-day concerns of the public and policy-makers world-wide. In spite of substantial public interest in environmental issues, and significant media attention, there is a widespread lack of

appreciation of the significance of the changes under way.

It is not just that scientists often find it difficult to explain themselves in plain language, but they have a tendency to assume that the relevance of research is self evident, when it is not. How can we improve our effectiveness at getting the message across? The following question and answer session, based on what we believe are deep human concerns, offers one approach.

### Are we being poisoned?

Poisons involve more than eating or drinking things that make us ill or kill us. We are adding poisons to

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the air that we breathe. The sources include emissions from vehicles, from industry and from agriculture. Although some emissions are being controlled in some nations, the overall levels continue to increase because of growing populations and expanding economies. The problem is global. Even remote areas over the tropical ocean are found to be polluted by the products of agricultural burning on distant continents.

We can also be harmed by radiation. The earth's outer ozone layer protects us and our crops from damage by ultraviolet radiation. The ozone layer has been thinning for several decades due to the emissions of certain man-made chemicals. In spite of international agreements which seek to eliminate the problem, ultraviolet radiation levels are not expected to decline significantly for some years yet.

### **Are we damaging our life-support system?**

The earth's ecosystems provide a variety of services essential to our well-being – services for which we do not pay and which we take for granted. These include the purification of water and air, the recycling of nutrients, the generation and preservation of soils, the pollination of crops, and even the regulation of the atmosphere's oxygen content.

Ecosystems are being damaged by human activities. We know about the effects of acid rain on forests and lakes, of toxic chemicals on fish and wildlife, of increases in ultraviolet radiation on all forms of life, and of the major impacts of changes in land use. In the longer term, shifts in rainfall and temperature patterns, resulting from climate change, will also become important. The earth's ecosystems are being strained to the point where their capacity to provide services upon which we rely may be seriously impaired.

### **Is there a future for my children?**

There is a tradition amongst some societies to 'tread lightly on the earth' – that we are only here as caretakers for our children, and that our actions must take into account the interests of future generations. In practice the uncertainties are so great that we cannot predict the kind of future that our children will face. However, it is likely that they will experience profound changes in ecosystems, in the climate system, in the availability of water and food, and in the distribution of diseases.

When we reduce species diversity, we know that we are depriving our children of future resources. And yet we do not know enough at the moment to choose which resources to save and which to let go.

### **What can science contribute?**

Nations, communities and individuals with the greatest understanding of global change and its consequences will be in a stronger position to take advantage of new opportunities and to adapt to the problems. Scientific research provides the best means of obtaining such understanding. Given the vast size and complexity of the earth system, we cannot rely on the traditional methods of science. An unprecedented degree of interdisciplinary and international co-operation is necessary. To succeed will be science's greatest challenge, but progress will depend on a wide acceptance of the importance of the goal.

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## **How accurate are weather forecasts?**

A meeting entitled "How accurate are weather forecasts?", held on 11 December 1996 at Imperial College, London, was a very popular Wednesday Meeting of the Royal Meteorological Society. The audience heard six presentations on the subjects of forecast accuracy and verification. Part of this report is taken from the abstracts which speakers presented at the meeting.

*J. E. Thornes* (BCAR, University of Birmingham – "The accuracy and quality of a sample of public and commercial forecasts") spoke about considerations

for monitoring the accuracy of forecasts relating to region, time period, specific weather elements and thresholds. Forecast assessments made use of statistical considerations such as skill, reliability, resolution, sharpness and uncertainty. At a time when commercialisation of forecasting is proceeding at an alarming rate around the world, Dr Thornes thought it essential to review the accuracy of forecasts to ensure that quality and accuracy are maintained. He pointed out that 30 years of temperature data from Birmingham showed that persistence forecasting (*i.e.* tomorrow's temperature would be the same as today's) had a 60 per cent success rate, while a 50 per cent success rate is