# Castles in the Saharan air

SIR—Many measurements have shown that the ozone layer in the troposphere is unstable, that carbon dioxide, carbon monoxide, methane, oxides of nitrogen, halocarbons and other trace gases and dust are increasing in the atmosphere, and that sea surface temperatures are warming, glaciers are receding and the sea level is rising[1-10]. I suggest a scientific project for correcting the buildup of $CO_2$.

I propose a feasibility study of an attempt to establish new flora and fauna in the Sahara, the world's largest desert and dust source, with 9 million km$^2$ of nearly uninhabited land, whose area compares with that of the rapidly diminishing tropical rainforest. The objective would be to import moisture and reduce dust erosion in North Africa, followed by $CO_2$ absorption as new plant life develops.

How can new life be started in the desert? Pumping solar-desalinated seawater into selected basins could locally raise the humidity, lower the temperature, reduce dust erosion and encourage the founding of new photosynthetic colonies. The project would be costly, but it has several social advantages: (1) it would be the first 'biosphere project', (2) it is one answer to the question "Who will pity Africa?"[11], and (3) it would require the agreement and participation of seven or eight Saharan countries; acceptance of the project would, however, be helped by independent scientists with a goal of benefiting all of humanity. Nevertheless, global benefits would be slow in coming; several decades would pass before there were significant changes in humidity and $CO_2$. Dust erosion might yield sooner because strong erosion areas could be fed water first, creating many small lakes. Dust is a desiccant, so soil and humidity are both carried away by dust erosion. Combined with the sandblasting effect of high winds, dust is hostile to all forms of life.

One practical problem is returning brine to the sea, which could upset local ecosytems if not properly dispersed, but which is necessary because of the huge amount of salt involved. At least 1 per cent of the Saharan surface will probably need to be covered with water for an appreciable global effect. Supposing a mean depth of 10 m, this corresponds to $>10^{10}$ tonnes of salt. Similarly, interaction of Saharan albedo, $CO_2$ increase, atmospheric warming and rainfall must be investigated further. Some experts think that a Sahara darkened by trees would contribute even more to warming because of reduced albedo. But such a forest would consume $CO_2$ and present a cooler surface to the air, counteracting albedo lowering; no clear synthesis of these opposing factors has appeared. Realization of the project could start in individual countries with financing by an international agency, but developments that might be integrated into the overall effort should be encouraged. At the same time, catastrophes must not be permitted, as could occur if raw sea water were pumped directly into the desert. The optimal degree of desalination will depend on numerous factors. Many plants in the Sahara are halophiles and a wide range of degrees of desalting can be considered. Ground water may be available in parts of the Sahel, allowing a limited but more rapid realization.

This is not a proposal for competing for existing research funding. It is a request that funding for development of a corrective process be created. The long-term consequences of pumping large amounts of water into North Africa are difficult to assess and must be studied thoroughly in creating a model. Environmental parameters need evaluation, particularly new surface covered by water. Barring unforeseen events, we may have something like 50 years to consider taking control of the evolution of the biosphere. This supposes careful preparation for trying to correct the accelerating damage already done. The Sahara could become the world's greatest species park.

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# Learning the lesson

SIR—A recent report from the National Institute of Economic and Social Research, reviewed in the *Daily Telegraph* of 1 December 1986, highlights the growth of Italian industry over the past few decades. By no stretch of the imagination is it possible to show that Italian research lies at the root of this achievement.

I trust, therefore, that it is not too harsh to ask those who voice serious concern for the decline of our scientific effort, supposedly the mainstay of our industrial future, to seek the roots of the problem. All who dispassionately do so will find that it is commercial and industrial wealth that underpins scientific research and not the converse.

In today's competitive and highly technological world, it will be those nations that have attended to the education and the training of their youth that will create the wealth that was ours during the one and only industrial revolution. The most important contribution that our scientific community can make to the nation's future is to become wholeheartedly committed, today, to supporting a broad technical education throughout our schools.

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# Inflation run riot

SIR—Perhaps Marcello G. Cacace (*Nature* **324,** 508; 1986), in reading Paola De Paoli's short survey of Italian scientific research policy (*Nature* **323,** 751; 1986), was so troubled by the contrast between the lavishness of the 'million million' lire research projects and the smallness of CNR salaries that he did not notice that all the million millions were mistakes.

In fact, in De Paoli's article, 1,000 million lire is transformed into 1 million million lire with almost miraculous, but exasperating, consistency.

When reading the article at the time, I thought it showed a rare ignorance, among *Nature*'s staff, of the value of the Italian lira.

I now realize that the value of the Italian lira is unknown to Italians themselves, and I dread the moment at which the threatened 'lira pesante' will become a reality.

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# Classification

SIR—L.M. van Valen (*Nature* **323**, 664: 1986) is wrong in suggesting that provision of a helpful taxonomic service is incompatible with doing interesting research. Studies by taxonomists or others on the evolution of molecular biology of their organisms need not be used to evoke the nuisance of frequent changes in nomenclature.

In order to minimize this nuisance, codes of nomenclature should discourage such changes. A commission for each group of organisms should issue a definitive list of names at, say, quinquennial intervals. Apart from newly described organisms, this list would stand until the next list was issued. Taxonomists could continue to publish as hitherto, but formal acceptance of nomenclature changes would occur at intervals of several years only.

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