

Charting the decline

SIR—The letter from J.F. Lamb¹ has prompted us to examine some data extracted from a recently published study². Table 1 shows country-by-country mean citation rates of papers published in *Nature* during 1981–85 as related to the mean citation rate of all papers published in *Nature* in the same period. All countries publishing more than ten papers are shown.

TABLE 1 Relative Citation Rate (RCR) of papers in *Nature*

Country	RCR	Country	RCR
Sweden	1.92	Poland	0.70
Switzerland	1.78	Italy	0.67
Japan	1.46	Austria	0.67
USA	1.18	Norway	0.64
West Germany	1.17	Canada	0.62
Denmark	1.07	USSR	0.52
Israel	1.05	Australia	0.46
The Netherlands	1.01	Spain	0.46
France	0.92	Brazil	0.41
Belgium	0.79	New Zealand	0.41
United Kingdom	0.77	Ireland	0.35
Hungary	0.75	South Africa	0.23
Finland	0.70	India	0.14

The relative citation rate (RCR) has a value greater than 1.00 when the papers of the country in question are cited above the journal's average and conversely. *Nature* published 8,043 papers in 1981–85 with an average citation rate of 16.63.

As can be seen, Sweden heads the ranking, followed by Switzerland, Japan, the United States and West Germany. The United Kingdom is ranked eleventh. This could be considered to be in line with the reports of Lamb and others on the decline of British science^{3,4} although other studies did not find any statistically significant decline in the indicators of British science during the 1980s^{5–8}. For that reason, we consider the whole problem of the decline of British science is still open to discussion — leaving aside questions such as what is meant by decline⁹ and whether whatever it is correlated with the decline in funding, for example.

Accordingly, we have repeated the same exercise with another 'high quality'

TABLE 2 Relative Citation Rate (RCR) of papers in the *Biochemical Journal*

Country	RCR	Country	RCR
United Kingdom	1.22	Norway	0.80
Sweden	1.21	Canada	0.79
Switzerland	1.16	France	0.79
Belgium	1.12	Spain	0.79
Denmark	0.92	Austria	0.79
The Netherlands	0.92	Hungary	0.74
South Africa	0.90	Ireland	0.67
West Germany	0.89	Finland	0.66
USA	0.89	Poland	0.64
Australia	0.87	Argentina	0.63
Israel	0.82	USSR	0.49
Japan	0.81	India	0.41
New Zealand	0.80	Chile	0.25

periodical, the *Biochemical Journal*.

Table 2 presents the results, covering 4,475 papers published in 1981–85, with an average citation rate per paper of 6.90. As will be seen, the United Kingdom is ranked in first position.

Our sole purpose here is to suggest that a counting such as that of Lamb is not by itself a sufficient measure of decline.

Bibliometric methods are not the most serviceable tools unequivocally to prove such a decline during the 1980s. A more realistic approach would show² that British science, like science in other countries, is in decline in some fields and on an upward move in others.

Moreover, in any population of papers, the distribution according to quality (citation rate is but a proxy) is highly skewed. Our investigations² indicate that probably the most important factor in improving scientific performance of a country is finding a way to raise the quality and not quantity of the publications by influencing the skew distribution to have a low quality 'tail' as short as possible.

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Growing dissent

SIR—The debate between advocates of sustainable economics and pro-growth economics is more complicated than implied by the recent leading article, "Doctrinal fallacies of stewardship" (*Nature* **344**, 179; 1990).

(1) The assumption that funding for scientific research and development entails economic growth cannot be cogently defended. While we agree that scientific enquiry is at present underfunded, both in Britain and elsewhere, the explanation cannot be attributed to any single factor.

(2) Clearly the term 'economic growth' has a ceremonial value, while 'no-growth lobby' has a pejorative ring. Yet even radical 'greens' are in favour of 'economic growth': the issue is what kind of growth. The article begs several questions. Just what, for example, do the national income accounts at present measure?

(3) While the article seems relatively sanguine about the future of European civilization, there is a remarkable inconsistency inherent in the assertion that Africa, "even before AIDS, seemed destined to be the first continent to be lost to human habitation through wayward mismanagement". Even assuming, out of ethnocentric arrogance if nothing else, that Africans bring the house down on their own heads, an ecological viewpoint forces recognition that our own self-interest is at stake. Africa is part of the global ecosystem.

(4) No responsible scientist claims to be able to predict the future (unless all other conditions are equal), yet the essay skates perilously close to prophecy on more than one front. Chaos theory, if it means anything *vis-à-vis* the environmental policy debate, implies that small and seemingly insignificant variables can have major unpredicted effects. Clearly, some kinds of economic growth could have unpredicted and disastrous ecological effects. Furthermore, even assuming adequate funding for basic science research, there is no guarantee that the knowledge necessary to sustain civilization as we know it will be forthcoming.

(5) Finally, the article ignores a host of so-called science–society issues that such luminaries as Albert Einstein and Erwin Schrödinger have raised.

Rather than being the last word, we hope that the leading article serves the function of opening up and extending the conversation. Perhaps the wide range of articles dealing with various facets of ecology, environment and human impacts that have graced the pages of *Nature* are the beginning of a vital process of public deliberation informed by scientific inquiry.

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Missing woman

SIR—Sachi Sri Kantha (*Nature* **344**, 582; 1990) concludes that 21 women so far have been awarded the Nobel prize. However, at least one woman was missing. In 1909, the Swedish novelist Selma Lagerlöf was the first woman to receive the literature prize.

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