time that human X sperm are statistically larger and longer than Y sperm.

Difference in size is one of the basic characteristics (such as speed, weight and so on) of X and Y sperm. It would be useful to analyse further these basic characteristics to develop sex-selected insemination programmes. The ability to correlate the sperm gene and chromosome condition with individual sperm shape and size also allows further investigation of the relationship between the morphological characteristics of individual sperm and some genetic diseases, which may improve the current procedures of preimplantation diagnosis by selected insemination or single sperm injection.

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■ A more detailed version of this manuscript is to be submitted for publication elsewhere.

Extinction rate estimates

SIR — Smith *et al.* in Scientific Correspondence[1] propose a new approach to estimating species extinction rates. They use International Union for Conservation of Nature and Natural Resources (IUCN) conservation categories, and look at the changes in 'Red Lists' for threatened animals (published at 2-year intervals) and in the World Conservation Monitoring Centre plant database to assess extinction rates. Central to their approach is the issue of how species are included in Red Lists and assigned categories. As already pointed out by Smith *et al.*, definitions of IUCN conservation categories are "largely subjective, and as a result, categorization made by different authorities differ and may not accurately reflect actual extinction risks"[2]. Similarly, Red Lists are biased towards attractive, spectacular and (sometimes) better-known species. Most of these lists underestimate the number of species at risk.

To be useful, the system proposed by Smith *et al.* would have to be based on species conservation status categories obtained in an objective way, which relate to the probability of extinction. Then species status trends could be evaluated through time. Current IUCN categories do not fulfil these criteria and cannot be used to obtain even a rough meaningful estimate of extinction rates. This is unfortunate because, to my knowledge, IUCN Red Lists are the only data of this type generally available for different plant and animal groups. (A more objective system is being sought, however[2]).

Changes in IUCN conservation category are related to existing knowledge about a given species, and not necessarily to real changes in probability of extinction. Some species have changed category, for example, simply because somebody looked for them in the wild. In such cases, what changed was the available information, rather than the actual status of the species. Further, Red Lists used are published at 2-year intervals, which reflect improvement in knowledge rather than a change in extinction risk (unless there has been a catastrophic or serendipitous event).

Smith *et al.* suggest that for higher vertebrates and palms their approach may reveal more about extinction rates than what is already known. But even for the better-known taxa the information in Red Lists is very limited and biased. Take, for instance, the case of Mexican mammals. Mexico ranks second in the world in the number of mammal species[3], with approximately 450 land and 50 marine species[4]. Of land mammals, some 217 (48%) species are endemic to Mexico and Central America[5], 149 (33%) are endemic to Mexico, and about 47 (10%) have very restricted ranges (<1,000 km^2) and are known only from a few localities[4]. Many of these species are rare[6] and are prone to extinction, especially given high habitat conversion rates. Hence they should be included at least in the 'rare' or 'indeterminate' IUCN categories, but only 15 (one endemic)[7], 22 (five endemic)[8] and 34 (fourteen endemic)[9] Mexican land mammal species are in fact included in the Red Lists for 1986, 1988 and 1990. Other, more comprehensive, lists include 108 species (60 endemic)[10] and 128 species (61 endemic)[4], these lists together include 162 species (79 endemic). Diamond[11] has presented a similar case for the birds of the Solomon Islands.

Smith *et al.* argue that "estimates of extinction rates for the better-known taxa are of the same order of magnitude as those derived from totally unrelated species–area relations". But given the uncertainties, these estimates may not be correct. I agree with Smith *et al.*, however, on the urgency of more research on the dynamics of species extinction.

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What mercury pollution?

SIR — The importance of silver mining in South America over the past 400 years as a source of mercury in the environment has been discussed in Scientific Correspondence[1,2]. Clearly, accurate analytical data are required for sensible discussion.

Camargo[2] makes the reasonable suggestion that the oceans are the principal reservoirs of mercury via inputs from the atmosphere and discharges from rivers. But by accepting the average concentration of mercury in unpolluted sea water as 0.1 μg l^{-1}, he overestimates the total quantity of mercury in the oceans by a factor of more than 100. The value of 0.1 μg l^{-1} was accepted as typical in the 1970s, when techniques of analysis and control over contamination were not as well-developed as they are today. The concentration of mercury in coastal sea water is around 1 ng l^{-1} or less, and the average concentration in the world's oceans is considerably less[3,4].

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Scientific Correspondence

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