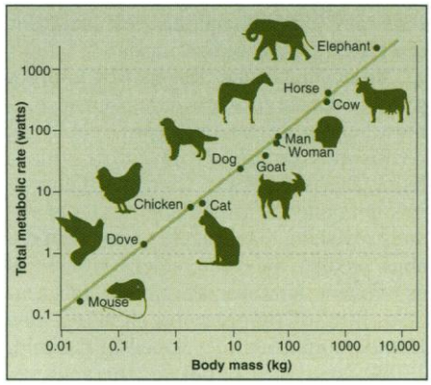
It is pointed out that relationships among size, metabolic rate, and the longevity of species are more complex than scaling laws would predict. And the essay "Being an absolute skeptic" was found to be thought-provoking, but its premise was questioned by many readers: "Does [the author] detect no tingling sense of warning that the mountaintop on which he stands is slippery with oil and beginning to shake?" asks one reader about the statement "Skepticism is correct." Another congratulated *Science* on publishing a spoof. The author answers the readers' criticisms.

Large Animals in the Fast Lane

In her commentary (News Focus, 4 June, p. 1607) on an analysis of fractal geometry and allometric scaling (G. B. West *et al.*, Reports, 4 June, p. 1677), Dana Mackenzie describes how new perspectives in mathematics and biophysics have at last begun to explain "why smaller animals spend life in the fast lane and die young, while larger ones burn energy more slowly and live longer." While we agree that it would be pleasant if nature followed the rules laid out by biophysicists, we want to point out that the relationships among size, metabolic rate, and specific longevity are considerably more complex and variable than one would guess from scaling laws. A wide range of well-documented observations is at odds with the oversimplified idea that little animals burn up quick and die young.



Correlation between body size and total metabolic rate

CREDIT: K. SCHMIDT-NIELSEN, *SCALING: WHY IS ANIMAL SIZE SO IMPORTANT?*

1) Within species, superior longevity is associated with body size in dogs (*1*), mice (*2*), flies (*3*), and probably humans (*4*).

2) Mutant dwarf mice live much longer than standard size mice (*5*).

3) Among mammals, some species live more than seven times longer and some less than half as long as predicted by scaling calculations (*6*), with longer life span typically associated with relatively risk-free ecological niches.

4) There is no relationship between body size and longevity among mammals below a body weight of approximately 1 kilogram (*6*), despite the enthusiastic deployment of fractal capillary networks by these smaller creatures.

The yearning to find an elegant theoretical explanation for why (some) big species live longer may need to yield to a suppler and more flexible theory based on a detailed understanding of genetic modulations to selective pressures.

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Skepticism and Relativism

Kudos to *Science* and David Miller ("Being an absolute skeptic," Essays on Science and Society, *Science*'s Compass, 4 June, p. 1625) for airing the claims of postmodernists and relativists that science deserves "no special claim to attention." Miller, following in the tradition of Pyrrho of Elis and David Hume, concurs that "absolute skepticism is correct" and that "science has no authority." But he relies heavily on Hume's claims that scientific theories based on observation of nature (induction) offer no predictive security because no argument can establish that nature is uniform. Although Hume's arguments are seductive, absolute skeptics are in error. Admittedly, nature is in flux. But it displays repetitive patterns, many cyclic. Were this not so, life could not have evolved as it has over billions of years owing to the inevitable time lag between environmental change and adaptive genetic responses. Our organs of sensation and data processing evolved to generate roughly accurate adaptive representations of nature. Therefore, careful inductive inferences about the future are rational and promote not only individual and group adaptation but also scientific progress.

Few scientists dogmatically claim true and certain knowledge. Most practice a mitigated skepticism and will allow a favored theory to be falsified by robust experimental evidence. Long ago, absolute skepticism was devised to neutralize disturbing truth claims so that the philosopher might not fret unduly about them. Absolute skepticism is an entirely appropriate attitude to take if confronted by truth claims that lack empirical justification, for example, the supernatural claims of dogmatic faiths. But it is not an appropriate or an adaptive one when confronted by microbial or molecular explanations of disease, or scientific analyses of evolutionary processes, or predictions of biospheric degradation. If philosophers, postmodernists, and relativists continue to urge absolute skepticism of science, the community of interacting scholars and citizens will become as balkanized as the political arena and international scene, where many *are* governed by absolute faith in their own views and absolute skepticism of all others.

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Miller says, "Skepticism is correct." Does he detect no tingling sense of warning that the mountaintop on which he stands is slippery with oil and beginning to shake? As he ably states it, skepticism denies that any opinion, even when applied only to the level of common sense, is more likely than another, on the basis of experience or evidence. I agree only insofar as Miller's position is unsupported by evidence. Actually it is a self-nullifying paradox. His calling Hume's opinion a "discovery" is another. Philosophers are struggling to hold on to science as simply one subdomain of their province of knowledge through reason. Quite to the contrary, I have felt for some time now that science has left philosophy behind, having found and held tightly the simple idea that one can ask certain questions in ways that increase our ability to predict nature's behavior. It is no more or less than that, and so it has escaped from philosophy's grasp. Science's core principle of falsifiability is a harsh master—one, in