

LSC

WORKSHOP #6

How to count gammas without a gamma counter

¹²⁵I-labeled samples of cAMP, cGMP, or proteins can be counted with precision and accuracy in a liquid scintillation counter. The counts obtained are from secondary emissions at rates about 75% of those by direct counting in a gamma counter. The procedures take a little more work, but a lot less gamma counter.

We have documented this technique in our LSC Applications Laboratory, not only in counting cAMP and cGMP, but in simultaneous counting of two isotopes; namely, ¹²⁵I-labeled binding proteins with ³H-, ³⁵S-, or ¹⁴C- labeled substrates. Send for the reports, LSC Application Notes #13, #24, and #25, by Dr. Yutaka Kobayashi.

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bers themselves are three times too low for Alaskan oil and three to five times too high for nuclear power. Apparently Lovins equates a kilowatt of oil thermal energy with a kilowatt of nuclear electric energy, ignoring thermodynamic losses and the cost of an oil-fired power plant. The interim replacement of short-lived oil field investments is also ignored. On the nuclear side, Lovins used very high costs for nuclear power plants and electric grids, an extremely low capacity factor, and an additional 43 percent "miscellaneous" category, to reach a total of \$5000/kW. A more realistic calculation (2) gives \$1650/kW in 1976 dollars, including fuel cycle facilities and electric grids. Transferring to Lovins' oil base at 0.0324 bpd/kW (the oil requirements of a new, combined-cycle, oil-fired plant), the capital requirements are \$56,700/bpd for nuclear power and \$66,100/bpd for oil.

Even more important than these costs is that to produce oil one must own, or capture, the land that has the oil under it. Many of the countries participating in INFCE do not have the option of an Alaskan oil investment, because their territories do not contain oil deposits. Presumably they might acquire oil-producing territory by aggression, but such a strategy would surely be costly.

The energy experts attending the INFCE meeting must surely have noticed the use of Lovins' soft numbers by President Carter. It would seem desirable for the President to ask for a less extreme viewpoint from his speechwriters if the United States is to have a useful impact on world energy policies.

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References

1. A. B. Lovins, *Soft Energy Paths* (Friends of the Earth-Ballinger, Cambridge, Mass., 1977); *Foreign Affairs* 55, 65 (October 1976).
2. Analysis by the writer, based on data from EPRI Technical Assessment Group, *Technical Assessment Guide* (Electric Power Research Institute, Palo Alto, Calif., 1977); I. A. Forbes and J. C. Turnage, *Exclusive Paths and Difficult Choices: An Analysis of Hard, Soft, and Moderate Energy Paths* (Energy Research Group, Framingham, Mass., 1977).

The Sociobiology Debate

The controversy on the human nature-nurture issue that ensued at the AAAS annual meeting (12-17 February 1978) in the symposium entitled "Sociobiology: Beyond Nature-Nurture" tended to obscure any rational dialogue within the symposium's stated topic. Apparently some individuals would repress scientific

discourse and research solely on the grounds that it might be misunderstood or misused by the wrong people. Sociobiology and its concepts are in their infancy. There are no claims to date by authentic sociobiologists as to *definite* race or sex differences in either human behavior or human cognition. There are only theories and preliminary evidence.

The groups and individuals who argue against research or discussion of sociobiology appear not to understand the most basic, underlying concept of sociobiology and behavioral genetics: $P = G + E + (G \times E)$, where P is the measured value for some character of an individual (behavior or otherwise), G is the value conferred upon the individual by its genotype, E is the environmental deviation resulting from all nongenetic causes, and $(G \times E)$ is the deviation resulting from genotype-environment interactions or the differential response of different genotypes to different environments (1). Therefore, it is apparent that the analysis of any phenotype is applicable only to that particular set of genotypes and environments in which it has been studied.

The implications of the above statement are quite straightforward. The study of sociobiology may not only help us understand better the causes of our behaviors and other characters but also help us direct our efforts toward restructuring our society in the ways we desire. Environmental engineering occurs not only in man, but in other life forms; genetic engineering has just begun. Both may suit our purposes. If, in researching a particular behavior, we find that most of the population variance is due to genotype, it may be that we have not studied enough existing environments or that we have not yet modified our environment sufficiently to increase the environmental variance. Closed minds on either side of the nature-nurture controversy will only continue its existence as a political juggernaut. There does not exist an either-or answer to this artificial dialectic. The real answer for human behavior and cognition analysis lies somewhere between and beyond nature-nurture. Sociobiology, beyond nature-nurture, contains the elements of our future. Let us get on with the work.

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References

1. G. E. McClearn and J. C. DeFries, *Introduction to Behavioral Genetics* (Freeman, San Francisco, 1973).