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January 9, 1969

Professor Joshua Lederberg  
Department of Genetics  
Stanford University School of Medicine  
Stanford Medical Center  
300 Pasteur Drive  
Palo Alto, California 94304

Dear Professor Lederberg:

Thank you very much for your note. I had not been aware of your column in The Washington Post until you sent me the copy. I am sending you, in a separate envelope, a reprint of the IEEE Spectrum paper as well as some of my other papers, also papers by some of my colleagues. As far as my own papers go, you will find that they probably do not add a great deal to the basic epistemology question beyond what you have already read in the IEEE Spectrum paper.

As far as work outside this laboratory goes, there is relatively little. There is a sequence of papers by Hans J. Bremermann, Department of Mathematics, University of California, Berkeley, California, as follows:

"Quantitative Aspects of Goal-Seeking Self-Organizing Systems," Progress in Theoretical Biology, Vol. 1, pp. 59-77.

"Quantum Noise and Information," Proc. of Fifth Berkeley Symposium on Mathematical Statistics and Probability, December 1965.

"Limits on Data Processing Arising from Quantum Theory," Self Organizing Systems Proceedings, Spartan Books, pp. 93-99, 1962 (M. C. Yovits, G. T. Jacobi, G. D. Goldstein, eds.)

I agree with Bremermann about the finiteness of memory available in the universe, but would disagree with the exact details of his equations. D. van Dantzig, in a paper, "Is  $10^{10^{10}}$  A Finite Number?" Dialectica, Vol. 9 (1956), pp. 273-277, presented an early mathematician's view of the problems involved in very large computations. Finally, you might be interested in the views

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expressed by Hao Wang, of the Rockefeller University, who gave us a talk in this laboratory a year or so ago, intended as a reply to my IEEE Spectrum paper. I am including a copy of that talk with this note.

I'll be visiting Berkeley on February 4, and our own San Jose Research Laboratory probably on February 3 and February 5. If you are not too busy that week, perhaps I can stop off in your laboratory for a second and make your personal acquaintance. Alternatively, and preferably, it would be delightful to have you visit our laboratory sometime and give a talk. Perhaps you could squeeze that in on your next visit east. We would be delighted to pay an honorarium and whatever share of your expenses would be reasonable to attribute to us.

We have crossed tracks on at least two occasions before; a few years ago, when Henderson Cole interacted with you, I was in the background and involved in at least one phone conversation with you. Furthermore, if I remember correctly, you preceded me in the Stuyvesant High School extra-curricular math department activities by a few years. Naturally, that's a one-way connection and you would be unlikely to be aware of it.

Sincerely yours,



Rolf Landauer

RL:mm