January 19, 1973

Dr. C.-G. Heden
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Dear Carl-Goran,

Thank you for inviting me to participate in your meeting in June. Unfortunately I cannot fit this into my schedule. However, I have discussed it with Don Glaser and Carl Ward (CETUS) with whom I often share my ideas in this field, and I believe at least one of them will be taking part.

Your letter reminded me that I had neglected to answer you about the commercial availability of fluorogenic substrates. For several years now our lab has concentrated on computerized GC/MS systems and I cannot give you the most up-to-date information. However, Mann Chemical Co. is the most likely source. Boris Rotman (at Brown University) might be able to give you later information.

I hope you have also been thinking of spin-label assay methods ("FRAT") which are generally similar in application to fluorogenic substrates, but may be even more versatile and less liable to noise background in some situations. Generally speaking, these methods (like radioimmunoassay) depend on the availability of metabolite-specific antibodies.

Have you received the issue of Icarus ( ) that gives a detailed description of the detection systems being installed on the Viking Mars 1975 landing mission? I assume you do via Mitz. (If not I will see that this is sent to you.)

Finally I wonder if you can help me on a point that has come up at CETUS. We contemplate investing a great deal of effort exploring new approaches at genetic strain improvement, to enhance yields in fermentation processes, especially antibiotics. But I have not seen an explicit system model that clarifies the utility of an increase in yield in contrast to other factors like medium, speed of fermentation, contaminating byproducts, solvent use and recovery, etc. Is utility a linear function of yield, increasing, or decreasing? I realize that different variables will dominate in different circumstances. But if you can point me to the best literature or other information resource for such process modelling in this industry I would be grateful.

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Have you thought of further measures that might be undertaken to reinforce the BW convention, e.g., to provide mutual reassurance to US, USSR, China, etc. that even basic research is not oriented to, or likely to be exploited for potential military use? What have you learned about Soviet actions towards compliance with the treaty? US steps, and criticisms thereof, are of course widely publicized. (See, e.g., 1972 summary in McCullough's review "Chemical and Biological Warfare: Issues and Developments During 1972", Library of Congress, Congressional Research Service, UG 447 72-264 SP, December 19, 1972).

I do not include CW in this question. The outlook for a verifiable agreement looks very dim; and perhaps the importance of that issue -- compared to general political improvements on one side, and the threat of a technology race in BW on the other -- has been inflated by its association with the Vietnam adventure.

Sincerely yours,

Joshua Lederberg
Professor of Genetic

JL/rr