

September 23, 1976

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Professor V.I. Goldanskii
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Dear Professor Goldanskii,

You were very kind to send me your letter of September 13th and the accompanying reprints. I was of course acquainted with your work published in Doklady on polycondensation under the influence of shock waves. I had overlooked your comments on low temperature chemical reactions and found them most interesting. I will look for the review that you mention which is about to appear in Annual Reviews of Physical Chemistry. (As I am on the Board of Annual Reviews, I will be getting complimentary copies of the volumes and need not trouble you for a reprint).

You asked me for some comments, which I will try to offer although these studies are at the very boundary of my own grasp as a molecular biologist.

First, I would agree that there is no longer any problem in principle about the chemical mechanisms by which the specific monomers and random polymers similar to those in living systems may have been formed. As you know, my main deviation from most of my contemporary colleagues working in this field is that I continue to point to the primary cosmological condensation as an additional factor besides the now popular model of chemical condensations in the primordial planetary atmosphere. (See for example Science, 127:1473-5, 1958). Further, the central problem at the present time seems to me the difficult one of bridging the gap between random condensations and those which have become template self-directed. I discussed this issue ~~briefly~~ in Science, 131:269-276, 1960. Although we can today see some possibilities of simplified analogies to the enzymatic template-directed polymerization of DNA, I think that our ~~dilemma~~ ^{dilemma in} relating this process to the coding of proteins is as much a dilemma as ever.

Second, I wonder if you have thought of the significance of low temperature tunnelling not just for the origin of life but for the general problem of the primitive cosmological condensation. I find it extraordinary that astronomers have tended to neglect the fact that condensed cosmic matter belongs almost entirely within the domain of organic chemistry.

Yours cordially,

Joshua Lederberg
Professor of Genetics