

Ames Research Center  
Moffett Field, California 94035

Reply to Attn of: LX:239-11

March 27, 1984

Dr. Krishna Bahadur  
Dept. of Chemistry  
Allahabad University  
68, Dilkusha, New Katra  
Allahabad 211002  
INDIA

Dear Krishna:

On behalf of the organizing committee I extend a cordial invitation to you to attend the 1984 Gordon Research Conference on the Origin of Life. As announced in the March 2 issue of Science, this meeting will be held at Colby-Sawyer College, New London, New Hampshire, during August 20-24. For your convenience I have enclosed a copy of the program and a listing of addresses for the speakers and discussion leaders should you wish to communicate with them.

The approach we adopted in developing the program was to identify some central attributes (sub-systems) of living systems, i.e., membranes, catalysts, energy-transduction apparatus, replication-translation machinery, and ask what we could infer about their origin and evolution largely from existing knowledge of biology. We anticipated that the simplest sub-systems composed of biological components would emerge in the talks. Juxtaposition of the simplest systems against the existing chemical models would reveal some of the gaps that need to be bridged by new research and new approaches.

The opening session on Early Evolution attempts to identify the physical-chemical bounds on the primordial setting; and it introduces evolution as a critical process (to which all systems on Earth were and are subject), what it means in the contexts of chemistry, geology and biology, and how an understanding of its manifestations and mechanisms in each of these three realms is central to gaining insight into the origin of life. The last session is designed to highlight two models for the self-organization of sub-systems into systems capable of evolution: one based on nucleic acids and the other on clay minerals. The discussions of these models should provide opportunity to address issues (among others) like: What, if any, is the driving force for self-organization? What, if any, is the "necessary" sequence in which attributes are acquired? The last round table discussion will focus on

May 5, 1986

Dear Krishna,

Received your letter of April 17. The Origin of Life Conference is being held in Berkeley which is only about 50 miles from here. However there is a registration fee of \$200 so I am not going. I am angry that the people in origin of life run the field as a private club so that is another reason for not going. Anyway I am getting too old to be an angry young man so I look at it philosophically.

There was a book recently on the field of origin of life. It is not a technical book but rather about the personalities involved. The name is "Origins" and I forget the author at the moment.. The book was very critical of the way the field is being run.

I saw Hyman Hartman last summer. He was staying at my home for a few days. He is going to leave the origin of life field this year and move from the east coast ( Boston) to a city near Berkeley probably later this year. So do not take Hartman not answering too badly. He does not answer my letters either and he is not taking the field seriously in my opinion. I have never had any contact with Cairns-Smith. So far as I know he has not any experiments himself. His ideas are good but he doesn't seem to have done much with them. Hartman was skeptical about Weiss' report on the clays. That is too bad since the Weiss work is so important potentially.

For the past year I have been interested in self-organization. That is the ability of system to become complex without intervention from the outside. Maybe we should write something about this together. The Origin of Life journal would not be a good place to submit it as it is dominated by the dumbbells.

I enclose a letter of acceptance to be an examiner for Ms. Geeta Kesarwanis thesis. I hope Rangam is doing well in here recovery.

My best wishes,

*Carl Sagan*

June 10, 1987

Dear Krishnat Rangan,

I have been wondering how  
the both of you are. How is  
retirement?

There is a lot of excitement here  
late on superconductivity at high  
temperatures. The main problem is  
how electrons (or holes or both) become  
coordinated over macroscopic distances.  
It has a relationship to the origin  
of life problem.

Please write me about what  
is happening.

My best,

Adolph

Adolph E. Smith  
109 Peter Coumts Cir.  
Stanford, CA 94305

USA



Dr. Krishna Behader  
68, Dilkusha  
New Katta  
Allahabad 211002  
INDIA

AEROGRAMME • VIA AIRMAIL • PAR AVION



**Around the Nation-Around the World  
World Communications Year 1983**

USPS 1982

Additional message area

Adolph Smith  
302 Moore Creek Road  
Santa Cruz, CA 95060  
USA



22  
Dr. Krishna Bahadur  
68 Dilkusha  
New Katra  
Allahabad 211002

INDIA

VIA AIR MAIL  
CORREO AEREO  
PAR AVION  
\*\*\*



B7

B2

## Biosystems Research, Inc.

19925 Stevens Creek Blvd., Ste.104  
Cupertino, California 95014

---

408 / 973-7817

August 17, 1987

Dear Krishna and Rangam,

I am sending this from the place where I am working part of the time. Enclosed are copies of the posters you had at the ISSOL last year. Also I made a copy of a newly discovered bacteria which uses only iron as the nergy source. This sis itneresting because the work relates to what you were talking about years ago. I am moving. My new address is:

302 Moore Creek Raod  
Santa Cruz, CA 95060  
USA.

It is better to write me at my home address.

My best,



NEWLY DETECTED MOLECULES IN DENSE INTERSTELLAR CLOUDS

WILLIAM M. IRVINE<sup>\*</sup>, L.W. AVERY<sup>+</sup>, P. FRIBERG<sup>#</sup>, H.E. MATTHEWS<sup>+</sup>  
AND L.M. ZIURYS<sup>\*</sup>

<sup>\*</sup>FCRAO, University of Massachusetts, Amherst, MA 01003, USA

<sup>+</sup>Herzberg Inst. Astrophysics, NRC, Ottawa, Canada, K1A 0R6

<sup>#</sup>Onsala Space Observatory, S-43900 Onsala, Sweden

Abstract The last year or so has seen the identification of several new interstellar molecules, including  $C_2S$ ,  $C_3S$ ,  $C_5H$ ,  $C_6H$ , and (probably)  $HC_2CHO$  in the cold, dark cloud TMC-1; and the discovery of the first interstellar phosphorous-containing molecule, PN, in the Orion "plateau" source. Further interesting results include the observations of  $^{13}C_3H_2$  and  $C_3HD$ , and the first detection of HCOOH (formic acid) in a cold cloud.

ADOLPH E. SMITH  
302 Moore Creek Rd.  
Santa Cruz, CA 95060

Jan. 8, 1989

Dear Krishna and Rangan,

Happy New Year.

It has been a long time since I wrote, about 8 or 9 months I think. For the past few months I have been working in the computer industry. I work as an engineer in chip testing. This is quite far from origin of life work. I need the money so I have no choice. My schedule is tough. I wake up at 5:30 AM, leave the house at 6:15 AM, drive for about an hour in heavy traffic, and return in the evening. So you can see that I don't have much energy left over to write much.

I would much prefer to be working on origin of life but that has been made impossible for the people who run the show. Individuals like Fox or Chang controlled the origin of life work so they have managed to stop progress in their part of the world. Origin of life work is basically quite different from most of science because we are working in synthesis whereas most science is analysis. That is why they oppose it and have turned origin of life work into dry analytical work. I wonder if the journal is still publishing. I saw Hy Hartmann a few months. He moved to the San Francisco area and has left origin of life as far as I know. I am going to see Hartman in a week or so I will find out more about what is happening. He is writing a proposal to do some work on iron clays. That pertains to the proposed space flight to Mars where it is thought that iron clays are on the surface.

I enclose an abstract of some new findings on chemicals found in interstellar space. Formaldehyde is certainly one of the most common chemicals in the galaxy. I remember your telling me that Abelson objected to the use of formaldehyde as a prebiotic material some twenty or so years ago.

Your work on the life-like properties of Jeewanu can nowadays be thought of as 'self-organization'. There is a lot of talk about chemical mixtures showing time and spatial correlations over distances of centimeters even though the chemical interactions are only over a distance of Angstroms. Please let me know what your recent findings are. I think they are the most advanced work in self-organization.

Best regards to your children.

All my best,

