

G A I A

58C St Marks Road
London W10 6NN

November 30, 1988

Connie Barlow
1613 8th Avenue West
Seattle WA 98119

Dear Connie Barlow,

I have just been reminded of your letter of 24th October, and the substantial enclosures, by a another briefer note just sent to me by Bob Charlson.

Please excuse my slowness in replying, it has not been simple indolence, things are busy here just now, and when you wrote I was in New York.

First of all I am delighted by the aims of your book and glad to help in any way I can, from giving full permission to quote as you wish from books and papers to answering specific questions that you might want to ask.

As I see it the key to understanding what Gaia is (assuming that it does exist) lies in a proper statement about life itself. The biologist's dogmatic litany culled from Neo-Darwinism that "Life is a process characterised by replication and the correction of errors among progeny by natural selection" is now bankrupt as a source of inspiration.

Like you, I begin as a first step by listing the characteristics of a living organism. They are:

- 1) A system with a well established boundary within which entropy is reduced at the expense of an excretion of entropy to the medium outside the boundary.
- 2) A system able to replicate in some manner, but at a rate that is some function of its life span as an individual organism.
- 3) A system that is, as in (1), a dissipative structure, but always includes a part that is of the solid state of matter. In this context an information bearing molecule like DNA or even simpler molecular structures would be considered to be of the solid state. Dissipative structures of the fluid state, although resembling living organisms in a few ways, are too transient to be

classified as living.

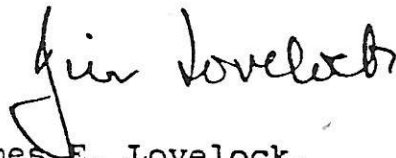
4) A living organism always evolves with its material environment (both internal and external) so that the larger system, environment and organism tightly coupled, shows emergent properties, in particular a tendency to the self regulation of those properties that favour survival.

This is a list that will grow!

My only disagreement so far is about your contention that the Gaia is a closed system. Closed it may be in a material sense, but so far as radiation is concerned its transactions in the visible and infra-red to my mind make it an open system.

With all best wishes,

Yours sincerely,

A handwritten signature in cursive script that reads "James E. Lovelock". The signature is written in dark ink and is positioned above the typed name.

James E. Lovelock.