

September 17, 1971

Dr. John W. Findlay  
Space Science Board  
National Academy of Sciences  
National Research Council  
2101 Constitution Avenue  
Washington, D.C. 20418

Dear John,

Elliott Levinthal has shared with me your letter of September 13th with respect to proposed revisions in quarantine policy.

I am in accord with these proposals with the following explicit and important exceptions:

- 1) I simply cannot agree that our present knowledge of Mars justifies a further reduction in  $P_g$ . My own view of the state of uncertainty concerning the possibility, for example, of sub-surface "permafrost" would lead me to assign  $P_g = 10^{-4}$  as the model expectation in the light of present knowledge. Roughly speaking I would assign  $P = 10^{-2}$  for the current estimate of the existence of extensive permafrost and another  $10^{-2}$  for the possibility that an organism deposited on the surface will have an opportunity to reach that layer.

It may be sufficient to say that  $P_g$  is drastically reduced the same reasoning would make the design of current biology experiments on Viking an absurdity, and this in turn would remove much of the scientific interest that attaches to the exploration of Mars.

I believe that the present policies, predicated on  $P_g = 10^{-4}$  are a reasonable accommodation of the diverse arguments that have been presented in this sphere.

2. and 3. (Venus and Mercury). The revisions are in accord with my own past doctrine that  $P_g$  (surface) for both of these planets approaches zero.
4. Outer Planets. **STRENUOUS OBJECTION!** I see great mischief in the merry-go-round of the Jupiter values chasing the Mars ones and vice versa. In the present state of our knowledge the a priority probability of viable habitats in Jupiter probably exceeds that for Mars. We know nothing of the altitudinal gradients of temperature and molecular composition of the Jupiter atmosphere and surface and quite plausible models have been presented that would offer very attractive habitats at certain strata. Whatever merit there may have been in comparing Jupiter with Mars in the past is

over

FINDLAY, J.W.  
(see also: Space Sc. Board)

degraded by the progressive decline of restraints for Mars. I would advocate a Jupiter policy based on  $P_g = 10^{-3}$  until further information on the structure of the planet allows a more refined revision in either direction.

5. I cannot object to including bus deflection within the system analysis of contamination probabilities. However, the reason for the hitherto unwritten policy was undoubtedly the difficulty of making credible estimates of the reliability parameters. If the engineering numbers can now be tested then certainly they should be explicitly included in the system definition.
6. Orbital Lifetime - Mars. Hurrah!
7. Apollo - Inventory of Contamination. Yes, I think we can relax on a detailed inventory of biological contaminants, since the existing burden by now is already so high! I would think there would still be some prudence in keeping track of the physical and chemical composition of materials that are deposited on the moon and then may later be recovered and serious questions then brought up about artifacts.

Sincerely yours,

Joshua Lederberg  
Professor of Genetics

JL/rr