



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS 77058

January 12, 1971

REPLY TO
ATTN OF: DC71/1/M34/71 (F&N)

MEMORANDUM TO: DA/Deputy Director of Medical Research
and Operations

FROM : DC71/Principal Coordinating Scientist of MO70

SUBJECT : Draft position paper on extending Skylab
missions 2 and 3

Reference is made to your memorandum DA71-MO13 which I have reviewed. The following comments on this draft paper are submitted for your consideration. My remarks do not include constraints imposed by consumable hardware, e.g., food which is also under the cognizance of MR&OD.

Title:

disagree
I believe that this significant policy paper should limit its scope to earth orbital flight and, in particular, to the specific question concerning the extension of Skylab flights. Orbital flights, in spacecraft other than Skylab or free flight, may well require different sorts of data for decision making processes.

Page 1 - Paragraph 1 and 3:

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Some reference, albeit very little, should be made to the demise of "Bonnie" and the potential utility of man-tended animal experiments in obtaining "new fundamental knowledge about human physiology" in weightless flight. Otherwise, the case for animal experimentation in flights beyond Skylab is a very poor one indeed.

Page 1 - Paragraph 2:

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Some reference should be made to the theory that the lack of compressional forces through the skeleton exerts its deteriorative effect through direct electrical mediation rather than through changes in the distribution of blood flowing through the circulatory system.

Page 1, Paragraph 2:

- ✓ The attainment of a new metabolic equilibrium after a period of orbital flight might not be acceptable if that equilibrium was at a level not compatible with return to lg.

sort of a "mitigate"
The empirical approach does not necessarily involve exposure of crews to every conceivable mission lengths. If, as is later pointed out in your paper, kinetic data is obtained at sufficiently frequent intervals, response curves can be extrapolated with a high degree of confidence.

Page 2, Paragraph 2, Line 4:

- ✓ The word "inflight" might be added after "ordinary".

Page 4, Paragraph 1, Line 4:

- ✓ I would suggest "type" be substituted for "caloric content". If we know what menu the crew is consuming, we will not only know the caloric content of that food but also where there are subtle shifts in the crew's intake, e.g., of high glucose loads indicating possible metabolic derangements.

Page 4, Paragraph 2:

hard data on 36 days?
The real time data from Skylab will not give us any information on possible shifts of bone mineral material from one site to the other. Such shifts could potentially limit reentry capability. The case could be made at this point for additional inflight monitoring techniques, e.g., of bone density if SL2, and SL3 are to be lengthened. } 2

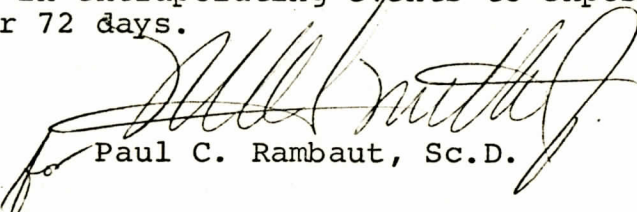
Page 6, Table 2:

the validity of this used
The necessity of gathering more data than the minimum indicated in this table might now be questioned. I believe we should still maintain that all results of medical experimentation conducted on SL2 should be available before a commitment is made to fly SL3. Even though one might safely extend SL2 from 28 to 36 days by the strategy you suggest, there is still a very definite need to conduct the ground based analyses of MO70 to adequately grasp the metabolic events of the flight. //

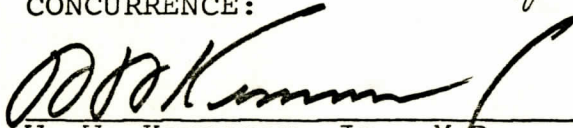
depends on post flight crew condition. If they're healthy as horses, the lack of these data would hardly matter in future flights.

• Page 7:

In extending either SL2 or SL3, the capacity to return daily samples of excreta in support of M070 will be overtaxed and the medical mission may be compromised. Even though empirical data good to 36 or perhaps 72 days will be obtained, the lack of good biochemical data on the kinetic response will make these flights less useful in extrapolating events to exposures much longer than 28, 56 or 72 days.


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DC71:PCRambaut:mb 1-12-71

*can this
be
settled
with by
statistic
sampling?*