September 18, 1958

Dr. John Wheeler
Department of Physics
Princeton University
Princeton, N. J.

Dear Dr. Wheeler:

My conscience still pricks me somewhat for having bowed out of your study group last summer, but in retrospect I think this was a sound decision, from the standpoint both of my usefulness and capacity. Conceivably I might have played some role in liaison between biological and physical sciences; the particular areas of biological warfare methods you indicated would have been far out of my ken, and I am sure you could enlist someone far better. I have to wish your meeting was reasonably successful, and, while I am not a little preoccupied by arrangements for moving to Stanford I hope I may be able to be of some help in this vital area in some other way.

Thinking very crudely and guessing broadly about the context of your discussion, it surprised me that you should be too deeply involved in what might be called 'alternative ultimate weapons.' Most of the technical-strategic problems would seem to be centered on the problem of delivery, and if we can deliver a thermonuclear weapon (or be able to threaten to) it is not obvious what would be gained by having alternative warheads. In turn, lacking any defense against this weapon, there seems little profit in concentrating too much effort in calculating defenses against alternative forms of attack, including the bacteriological and neurological agents. This is predicated on the overall strategy of ready retaliation as the main defense, and it seems unarguable that the certainty of delivery is the main problem.

It is also obvious, say from the Rockefeller Bros. report, that the strategy and tactics of limited warfare pose less straightforward (not necessarily more difficult) problems, and I would hope that the attention of scientific talents could also be directed to these less spectacular, less 'advanced' areas, where serious issues may well be decided during the next several years. For this reason, it would disturb me profoundly if there were not a group conducting an analysis of the functions of the infantryman, for example, with a view to perceiving which of these functions might be expanded or replaced by automata. In your phone conversation you implied that you knew nothing along these lines.

The suggestion may be crudely naive, and it is based on no personal experience, but do you think we lack the technology to devise a 'strafing machine' that might enlarge the effectiveness of an infantryman manyfold, if not replace him altogether? The homing devices that control a guided missile should be able to be adapted to guide a rifle, or its equivalent. The most difficult problem might be recognition, not so much as between friend or foe, as perhaps between foe vs. neutral or captured, which could give some meaning to an automatonatic 'occupation of territory'. I am not going to write a paper now on the design of such a machine, or what its technique of locomotion, armament, defense, recognition and control, ought to be, but I would be greatly disturbed if the scientific advisory groups were so preoccupied with advanced projects there were no room for so homely an item. Before going any further, we need advice on just what the infantryman's functions are, when boiled down to essentials. And so for the other combat functions likely to be involved in 'limited warfare'.

Yours sincerely,

Joshua Lederberg
Professor of Genetics